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3

PRACTICAL TREATISE

ON

OPHTHALMIC MEDICINE.

BY

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P R E F A C E.

THE object of the author in the following work is to present the student and actively engaged practitioner with a complete digest of all that is known of the Diseases of the Eye, both from his own experience and from all sources, British and Foreign. In order, therefore, to suit their convenience, he has condensed his chapters, as far as was compatible with a *complete practical* view of the subjects treated of, by the use of clear, concise language, and by the omission of all unimportant or useless matters, tedious details of cases, historical particulars, and mere learning, by which the pages of more voluminous works are swelled. At the same time, he has endeavoured to introduce every useful, practical, and interesting fact, which he has learnt by the very extensive opportunities of observation afforded him by cases under his own or other's care during the last nine or ten years, and by the perusal and digestion of almost all the books, essays, and papers published on ophthalmology, or which, although not devoted to the subject, contain valuable hints in connexion with it. As the main object has been to render the volume a faithful guide in treatment, the author has introduced a chapter on the best modes of examining the eye in various diseases, of arriving at a just diagnosis, and of directing treatment on the most successful principles. Full directions will also be found on the mode of applying the nitrate of silver to the outside of the eyelids—which has been found of the greatest value in many superficial diseases of the eye—the circumstances under which it proves most efficacious, and

the contrary, as well as the introduction of drops and collyria between the lids. The diseases of the eye themselves have been divided as they are actually met with in nature, and into those forms by which treatment, to be successful, must be guided.

The work will be found, it is hoped, a just medium between the many valuable and voluminous works we possess on the Diseases of the Eye, and the small, incomplete volumes, which are nearly useless to any one really desirous of gaining an accurate knowledge of the subject from their extreme brevity and empirical tone. Although, as I have previously remarked, no opinions are quoted for the sake of mere learning, yet the volume will be found to refer to the opinions and practice of many British, French, German, American, and other authors ; not collected, as is too much the custom, as a mere mass of conflicting opinions, by which the student and practitioner are rather confused and rendered uncertain whom to believe, than edified and instructed in the best mode of procedure, but their respective merits weighed, and that practice recommended which has been found most efficacious and trustworthy. With the concluding part a classified list of these authors, and the various papers, essays, monographs, and treatises referred to, will be published for the information of those who desire to read and judge for themselves.

It may be remarked, that as the productions of almost every author of any note contain portions of especial value, the correct, careful, and unprejudiced collection of such parts, when combined with any original information which the author is himself capable of furnishing, form by far the most useful work for the student and busy practitioner ; who require rather a clear view of all that is likely to prove useful to them than the laboured productions of strictly original authors, whose views require much detail for their development and proof, and which, after all, are often incorrect, or must stand the rigid test of experience before they deserve credence.

In a work of the present kind, a small price also renders it more likely to suit the wants of those for whom it is intended ; and hence it is impossible to introduce highly finished plates and coloured engravings, which are sometimes useful to give a good idea of disease and operative proceedings. Badly executed and incorrect representations are worse than useless, and on this account they are entirely omitted in the present volume.*

13, Bloomsbury Square,
1844.

* Report of the Cases admitted into the Mutford and Lothingland Infirmary, &c., by W. C. Worthington, Surgeon to the Lowestoft Infirmary.

“ Many of the cases of conjunctivitis were treated on the plan recommended by Dr. Hocken, viz., the external application of the nitrate of silver in substance to the upper and lower lids. This mode is scarcely attended with any pain, and the rapidity with which it sometimes arrested the inflammatory affection was very striking, one application being generally sufficient, and it seldom required to be repeated a second or third time.”—*Prov. Med. Journ.* vol. i. 1843-4, p. 308, Jan. 20th, 1844.



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ON THE DISEASES OF THE EYE.

INTRODUCTION.

I. THE LEGITIMATE MANNER OF CONDUCTING OPHTHALMOLOGICAL STUDY.—NECESSITY AND ADVANTAGES OF PREVIOUS KNOWLEDGE OF DISEASE.

By dividing the study of medicine into principles and practice, the student is first instructed in those general laws to which disease is subservient ; and secondly, in the affections of particular organs, being illustrations of principles. No one can possess scientific views of ophthalmic disease unless its study be based on comprehensive views of diseases generally ; hence all was dark and erroneous as long as this department of medicine was monopolised by the charlatan, and it has only within the last few years acquired its present clearness and accuracy. In the eye we may behold a miniature representation of all diseases ; for here, says Dr. Latham (*Med. Gaz.*, vol. iii. p. 216), “ Nature has displayed, as in a glass, all the little intimate details of her own wonder-working powers ; her modes of disorganising, and her modes of repairing ; and the aids which she receives, and the impediments she sustains from the right and wrong application of medical agents.” From the very vascular and nervous constitution of the eye, its situation, and constant occupation, it is extremely prone to diseased actions, especially those of an inflammatory nature ; and, although of comparatively small size, it furnishes some of the best opportunities we possess of observing, inspecting, and tracing in all their stages the pathological states of mucous, serous, fibrous, muscular, and nervous tissues, as well as of some structures that are peculiar to the eye.

Moreover, by a careful investigation of ophthalmological phenomena, we may gain much insight into the nature and process of local diseases in other parts. For instance, by taking the visual nervous system as an example, when suffering from hyperæmia, we may gain an accurate idea of congestions in general ; or the nature and peculiarities of local

hysteria from the study of hysterical amaurosis. One great advantage in these investigations is, that we can bring the sense of sight to follow the steps of the disease in the great majority of instances. We see the vessels enlarge, and parts that were previously white, or transparent, become red with blood. Our sight detects the advance of swelling, the effusion of serum, lymph, or blood, and the gradual loss of transparency and brilliancy, or peculiar colour. It is true that some of the deeper-seated tissues are less readily inspected during anormal states, although the practised eye can learn much even in their diseases. Take, for example, the retina, which is invisible during health, but becomes visible during disease, so that we can appreciate readily the changes which it undergoes from loss of transparency, effusion of lymph, or displacement, by a careful and minute inspection. In fact, we possess, in the eye, a privilege of following the mode in which nature proceeds, of tracing the commencement, progress, and completion of pathological changes, and the effects of treatment, in a manner which we cannot do in any other organ. No other part affords so favourable an opportunity of studying inflammation in all its forms and stages, of tracing the influence of constitutional conditions on local disease, of observing the modifying effects of tissue, and of actually inspecting and following the immediate and remote consequences of treatment.

In other parts of the body we are compelled to wait until after death, in order to connect particular symptoms or signs with definite changes of structure or organisation; whilst in many important parts of the eye we can connect these morbid phenomena, with the actual lesions of structure, as they arise and progress, better than if exposed by the knife of the anatomist. We must admit, however, that one great drawback to the knowledge otherwise attainable in the more obscure diseases of the eye, is the rarity with which they afford any opportunity of making a post-mortem examination during the progress of the disease, or shortly after the tissues have suffered organic change, so as to connect the detectible alterations with the symptoms during life. For it will be obvious, that if no examination of an eyeball be made for several years subsequent to the destruction of its powers of vision, its condition at that time will throw little, if any, light on the primary disease.

Besides an accurate knowledge of disease generally, it is essential for the ophthalmological student to be well versed in anatomy and physiology, not of the eye itself merely, but of the whole body. Who could understand, for example, anything of the retina and optic nerve without a general knowledge of nervous structure and function, or of the conjunctiva, without a previous acquaintance with the composition and offices of mucous membrane? Indeed, as Dr. Jacob truly remarks, (*Dub. Med. Press*, vol. i. 1840-41, p. 331,) "there is not in the whole range of the nosology a class of diseases which requires more intimate knowledge of the structure and functions of the animal frame than those which affect the eye."

As diseases of the eye do not differ essentially from diseases in other parts of the body, so in their general treatment they require the same regulating principles, although, of course, there are some differences. As has been elsewhere remarked, (Brit. and Foreign Med. Review, vol. x. p. 3, 4,) the complete analogy is not an *à priori* matter, it is only to be perfectly comprehended *à posteriori*; that is, when we are so far acquainted with both classes of disease as to be able to distinguish what is fundamental from what is accessory, and then, excluding the latter, subjecting the former only to our comparison. Pursued in this manner, ophthalmic study illustrates, and is illustrated by other diseases. "The points, however, in the pathology and therapeutics of the eye which demand special consideration are so numerous, so complicated, and often so much out of the way of general pathology and therapeutics, that, considering the importance of the sense of vision, a course of medical education cannot be considered complete, unless ophthalmology has for some time especially engaged the student's attention. And here we would remark that, to study ophthalmology effectively, an extensive and accurate knowledge of anatomy and physiology is the best preparation." (Ibid.)

Whilst on this subject, I cannot do better than give a short analysis of a very valuable paper by Dr. Jacob, "On Diseases of the Eye, as a Guide in the Study of Pathology," (Dub. Med. Press, vol. vii. pp. 225-30,) the views in which entirely coincide with my own. He endeavours to show that the study of diseases of the eye is eminently calculated to improve the knowledge of the nature of disease in other parts of the animal frame, and therefore that it is a branch of medical education worthy of particular encouragement, and also an object worthy of the attention of the most enlightened practitioners. The eye is destined to perform an office in the animal economy totally different from that of any other organ. The operation of light on the mind is entirely effected by it, and therefore many of its component structures must be of a peculiar nature, and not only perfectly transparent, but delicately correct in their refracting properties and vascular form. In the eye alone can we examine the composition and properties of the material which forms a cornea, a lens, or a vitreous humour, or study the changes which take place in them from disease. It is by an investigation of the properties of all parts of the living being that we can form a correct estimate of the whole; and therefore it is that an organ which affords several anatomical ingredients of a distinct and peculiar nature constitutes a valuable object of study, and an additional source of information. Where else, throughout the body, except it be in the labyrinth of the ear, so difficult of access, can we see the final expansion of a nerve to receive the most delicate impressions to which a nerve is subject? Where, except on the iris, can we contemplate the undisturbed and uninterrupted action of muscular structure, called into operation by delicate impressions and complicated associations? It is in the chambers of the eye alone that we can see the

production or removal of a fluid in exact proportion to the space it is to occupy, and there only the decisive proof of the influence of vitality distinguished from mere physical agency. It is also in the flow of tears from the lachrymal gland we have the most direct and convincing proof of the effect of emotions and passions on glandular secretions, whilst in no other part of the body have we such perfect ocular demonstration of the modifications of mucous membrane, as in the conjunctiva,—villous, glandular, and red-blooded on the inside of the lids; thin, tough, and smooth, over the exposed part of the sclerotic; and transparent, soft, and polished, where it covers the cornea.

As the light producing vision can only pass through transparent parts, we are enabled to observe the organisation and properties of the structures beneath, under the most favourable circumstances. Thus we can contemplate the changes in the minute blood-vessels from any source of irritation, and here alone ascertain that the vessels of transparent parts admit colourless fluid under ordinary circumstances, but, when stimulated or irritated, receive red blood in abundance. We examine the foot of a frog, the tail of a fish, or the wing of a bat, to ascertain the state of the circulation in the smaller vessels; but we might observe the same much more distinctly on the surface of the sclerotic, through the transparent conjunctiva, or in the iris of the albino or white rabbit. In enumerating the instructive lessons to be derived from the observation of the actions of the iris, the effects of belladonna on the pupil must not be forgotten; the influence of a narcotic poison on the functions of an organ through the nerves is here unequivocally displayed, and the importance of the fact that such influence can be thus exercised is unequivocally proved.

If physiology can derive illustrations and explanations from this source, pathology can borrow still more largely. It must be admitted that the opportunities of observing the condition of the true mucous membranes, in a state either of health or disease, are few indeed during life; and it cannot be denied that conclusions drawn from observations made after death must necessarily be of doubtful value, whilst the most delicate changes may be seen with facility on the surface of the eye and the inside of the eyelids. For it is obvious that much juster conclusions may be drawn from observations made during life, and when the diseased structure is seen under every advantage as to period and variety of condition, than can be obtained from the mere appearance of parts after death, than which nothing can be more fallacious. The inflammatory redness of mucous membrane may be seen in conjunctivitis from the first blood-shot, as it is called, to the final conversion into a surface of uniform turgid redness. There is a consequence of inflammation of mucous membranes scarcely to be seen during life, except upon the conjunctiva, and yet it probably occurs frequently, viz. effusion of serum into and beneath the membrane, in the eye, termed chemosis. Œdema of the glottis appears to be of this nature, and the patient perishes from it, because no depletion can diminish the

swelling which mechanically obstructs the passage. The alterations of mucous secretion can also be better studied here than elsewhere; the observer has only to open the eyelids in ophthalmia to see the secreted matter on the very surface which produces it, and to ascertain the exact period at which it makes its appearance, and at which it ceases to flow. It must be admitted that a correct knowledge of the state and nature of the secretions of inflamed mucous membrane is of great importance towards an accurate diagnosis and prognosis; yet the information respecting them is very imperfect, and erroneous conclusions abundant. This information can be acquired, and these errors corrected, in part, at least, by an accurate examination of the conjunctiva. The various affections of the conjunctiva, lids, lachrymal organs, &c., all afford an abundance of interesting, curious, and instructive forms of disease, not less valuable because on a small scale, nor less important because they are peculiar.

Careful observation of the effects of inflammation and injuries of the cornea will go far to prove that the notion of transparent and colourless parts being less perfectly organised, and less under the influence of vitality than other structures, is an erroneous one; and if so, that the theories and practice founded on it are mischievous. That colourless parts are destitute of vessels is utterly unfounded. The cornea, a peculiar animal texture, eminently transparent, and not admitting a particle of red blood into its vessels, exhibits powers of reparation and growth, not only equal, but superior to those of other parts remarkable for the quantity of red blood circulating in them; no part uniting by first intention so frequently, or under circumstances apparently so unfavourable as this colourless texture. The pertinacity with which wounds of the cornea heal when it is punctured in various diseases, is quite remarkable. If any would embrace a favourable opportunity of studying the process of ulceration, let him watch the cornea when affected by slough, abscess, or spreading ulcer, and undergoing the various changes of healing, till final cicatrisation.

The iris affords a beautiful opportunity for accurate observation, and when inflamed presents appearances which the pathologist can recognise in no other situation. The change of colour from increased vascular turgescence, or from purulent or other depositions; the distinct abscess, or globule of lymph; the impaired power of contraction, and irregularity of the pupil, are all beautiful and instructive phenomena; but the adhesion of the margin to the capsule of the crystalline lens is still more remarkable, for we find the pleuræ, &c., adherent after death; but in the eye we see the surfaces unite, although immersed in fluid, and scarcely coming into visible contact. No better example is to be found of the direct and unequivocal action of a remedy on disease, than that of mercury in syphilitic iritis. The very day, nay, perhaps the very hour the metal becomes part of the system, its power is triumphantly displayed. Taking the lining of the chambers as an illustration of serous membranes, we have a living proof of what is supposed

only to be going on in other places, and of which there is no certain proof till after death. (It is true, however, that in other serous membranes the sense of hearing will give us almost as much information as the sense of sight.)

The lens affords an opportunity of observing alterations not to be seen in other parts of the body. The loss of its transparency, or cataract, from whatever cause it arises, is a form of disease new to the pathologist when he first observes it. The varieties of cataract are much greater than are generally supposed, so much so that it is difficult to account for them, when we recollect the causes to which they may be traced. The effect of age in inducing colour, loss of transparency, and induration, is well seen in the hard, amber cataract of advanced life; while the soft, watery, opaque lens in childhood, reminds us of the healthier state of the system at that early period. The different lengths of time required for the absorption of cataracts broken up by operation, according to age, sex, and vital energy of constitution, are surprising. In the young and healthy they disappear rapidly, but very slowly in the aged and infirm. A curious fact, noticed frequently by Dr. Jacob, is, that cataracts, with every advantage, are singularly slow in disappearing in females about fifty.

The optic nerve is more favourably circumstanced than any other for observing the condition of the nervous system in a state of health or disease, and the retina presents a better index of the state of the brain, when implicated in other affections, than any other sensitive surface. Defective vision, &c., are eagerly inquired after by the observant practitioner, where the head is supposed to be engaged, reminding him that other organs may have their functions seriously impaired by similar causes. Trifling derangement of other senses are scarcely perceived, even by the patient himself, but the slightest disturbance of vision excites alarm. If vision can be impaired from asthenic conditions of the system, the practitioner should bear in mind that other nervous functions may be impaired from similar causes. Here we can learn much, also, of neuralgic, spasmodic, and paralytic diseases in general, by observing morbid conditions of winking, spasmodic squint, loss of sight, paralytic conditions of the muscles, and neuralgia of the iris. From our being able to distinguish the nerves of sensation from the nerves of motion in this situation more perfectly than in others, the various shades and forms of neuralgic disease may be more easily traced to their source, and the seat of the disease more easily determined. And, lastly, in no other part of the body but the eye can it be shown, that interruption of the functions of a nerve interferes so seriously with nutrition as to lead to the destruction of the part supplied, but the cornea becomes inflamed, and sloughs from disease or division of the fifth nerve. (This is but the cream or essence of Dr. Jacob's paper; the whole, however, is well worthy of attentive perusal.)

In conclusion, I would remark that many of the diseases of the eye are identical with disease in other parts of the body: thus catarrhal

conjunctivitis is identical with catarrh of the Schneiderian membrane, gonorrhœal ophthalmia with gonorrhœa, granular disease with granular inflammation of the cervix uteri, &c.; but it would be absurd to consider that the generality were so, for nearly the whole are greatly modified by local peculiarities, and there are not a few quite distinct and separate.

CHAPTER I.

SECTION I.—EXAMINATION OF THE EYE IN DISEASE.

IN the diagnosis of ophthalmic disease accurate examination of the affected organs is almost always of the utmost importance, and as this cannot often be effected unless the practitioner proceeds with extreme delicacy and skill, a few remarks on the subject may not be misplaced here. However well versed in general practice, if a man be not accustomed to examine diseased eyes, he is almost sure to defeat his own object by his manner of conducting the examination; and if this be the case with the well-informed, we can imagine the awkwardness, violence, and absurd manner of the ignorant. Mr. Middlemore (*Treatise on the Eye*, vol. i. p. 88-9,) mentions, that in a case of extraction, nine days after the operation, it had proceeded so favourably that few would have judged any operation had been done, unless attention had been expressly directed to the circumstance, but happening to show this case to a surgeon from the country, he handled the eye so roughly as to cause great pain, followed by very severe ophthalmia. Besides unnecessary roughness and violence, inexperienced persons are apt to place patients in the direct glare of light from a window, &c., and to be extremely awkward in managing the lids, pressing on the eyeball instead of gently raising or depressing the upper and lower eyelids.

It is the best plan to gain all the information possible, by carefully inspecting the outside of *the lids*, their edges and angles, and the exposed parts of the *eyeball*, before we touch the eye at all; for in this manner we often gain very valuable hints, and can often see the eye, where there is much intolerance of light, when it would be difficult or impossible to do so in any other manner. In strumous ophthalmia, for example, we can often catch a fair glimpse of the front of the eye when the child is looking over its nurse's shoulder, quite unsuspecting of any examination going on, or, in the affections of adults, while conversing with them on some other topic. In all diseases attended with intolerance of light, the patient should not be *exposed* to a direct or very powerful glare, but be so situated as to enable the practitioner to see clearly, and to throw an oblique light on the organ to be examined.

In the great majority of instances it is necessary to *separate the lids*,

and in some cases to *evert* them. As in all other operations, there are right and wrong methods of proceeding. "It may seem absurd," says Mr. Morgan (Lectures on Diseases of the Eye, p. 24), "to suppose that any medical man in his senses would throw a stimulating injection into the eye as a preparatory step to separating the lids, and obtaining in that way a view of the inflamed globe. Yet many are producing now and then the very same effect as that which would result from such a proceeding by different means. This effect is occasioned by the manner in which many a novice is in the habit of opening an inflamed eye." Mr. Morgan gives plates of the usual modes in which bunglers make the attempt; in the first, each thumb is placed on the tarsal cartilages, pressing with force on the globe, and rubbing the inflamed surfaces together; in the second, elongated finger-nails are insinuated between the lid and globe, and the inflamed surfaces clawed asunder.

The proper plan of *separating* the lids, in all ordinary cases, is to raise the upper lid first, and in some cases to depress the lower subsequently, by placing the thumb horizontally below the eyebrow, taking care that its lower edge is not placed as far down as the tarsal cartilage, and drawing the lid upwards by the external skin, by which means thus it is raised and separated from the globe, preventing the inflamed surfaces rubbing over one another, and all pressure on the eye itself. In depressing the lower lid, the point of a forefinger or thumb should be placed vertically about its centre, below the tarsal cartilages, and the lid drawn down and slightly everted by its integument. I have found this plan of proceeding better than raising the upper and depressing the lower lid at one and the same time.

When much swelling of the conjunctiva and lids are present, the foregoing plan may either cause inversion of the lids, or prove quite inadequate to expose the globe. Under these circumstances it may be necessary to act differently in raising the upper lid; the extremity of the finger or thumb must be brought vertically to the centre of the tarsal cartilage, the edge of the nail being below its margin, and beneath the eyelashes (not hooked between the lid and globe), and in this manner the cartilage is to be pushed upwards towards the edge of the orbit, raising the lid slightly from the conjunctiva oculi, and making no pressure on the eyeball.

A third plan may be necessary in children, viz., the forcible separation of the lids. The child should be seated in the nurse's lap, with its back towards the practitioner, who then lowers the head, and places it firmly between the knees, so as completely to steady it, whilst the nurse keeps the arms, body, and legs, as still as may be, for the child often struggles most violently.

As a general rule, we should not attempt to examine the eyes of children whilst they are crying, or resisting powerfully, but an opportunity should be taken of quickly and easily raising the upper lid, either whilst they are asleep, or are quiet and unsuspecting. It is only in older children, who cannot be thus treated, that forcible separation

becomes necessary. Dexterity and adroitness are only to be acquired, however, by a little experience and observation, which the intelligent student will soon gain.

The best plan of separating the eyelids in many operations on the eye is to place the extremity of one or more fingers on the tarsal part of the lids, bringing the edge of the nails against their margins, and carrying the lids in this position against the orbital edges. In this way the lids are raised slightly from the globe, and therefore no pressure can be made on it, whilst the eyeball is fully exposed without inducing any irritation.

To *evert the lids* nothing more is requisite than to place a probe horizontally across them, above the tarsal cartilages, and to press downwards with a gentle force, whilst the edges of the lids are drawn upwards by the lashes. Where we merely wish to inspect the conjunctiva of the lid, without inverting it, we can do so by lifting it off from the globe by the cilia, and holding it at a moderate distance; in the lower lid it is sufficiently exposed by merely drawing downwards by the integument. An eye should not be exposed for too long a period, nor too frequently examined, especially after an accurate view has been already obtained.

In many diseases, especially those of an amaurotic character, we wish to ascertain if the globe be either morbidly tense, flaccid, or healthy; to do this the patient closes the lids, and we examine, by the touch, its degree of resistance, placing the thumb on one, and the forefinger on the other lid, and comparing the state of the two globes with one another, and with that of an healthy organ.

In those diseases of the eye which affect the more superficial parts, the observer should look not only at the organs directly, but also with some degree of obliquity; for, frequently, ulcers of the cornea appear as mere opacities if we directly face the patient, but, viewed obliquely, the breach of surface is readily apparent. So, also, if we look directly at the cornea, it is difficult to tell whether the capsule of the aqueous membrane or the cornea itself be cloudy, but no such difficulty exists if we view these parts obliquely.

In ordinary cases it is not necessary to *close one eye* whilst we examine the other; but in all cases of suspected amaurosis we should direct the patient to do so, and cover the organ with his hand; for it is necessary to recollect the physiological fact, of the consensual movements of the irides, so that if one eye be sound the iris of the blind eye will move, in some degree, in accordance with the motions of the sound pupil. In all these cases the pupil of the amaurotic eye will dilate if the sound eye be closed, becoming dilated to its full extent if the light be still further obstructed by placing the hand over the eyelids of the closed eye. Again, where we have a case of simple imperfection of vision, with a dilated pupil and an absence of the ordinary constitutional and local symptoms of amaurosis, it is well to make the patient *look through a small clean aperture in a*

card, in order to distinguish mere enlargement of the pupil from nervous imperfection of vision.

In all the deeper-seated diseases of the eye, attended by cloudiness of the humours, the eye should be examined whilst the pupil is dilated from the influence of belladonna; placing the patient in a good light, and looking towards the bottom of the eye both directly and obliquely. It is in these cases that what has been termed the *catoptrical* examination of the eye (this method was first discovered by M. Purkinje, of Breslaw, but came into a general use from a clinical lecture by M. Sanson) is so useful. It is thus conducted:—

The pupil being dilated by belladonna, a lighted taper is to be held at a short distance from the eye, in front of the pupil, moving it slowly from side to side. The flame should burn steadily, or, in some cases, we shall find the bright wick of a candle, the flame of which has been blown out, most useful. Under these circumstances we observe three reflected images of the light in a sound eye, or in an eye where the cornea, lens, and its capsule, retain their transparency and brilliancy. Of these, two—the anterior and posterior—are erect, whilst the centre one is inverted. The erect images follow the motions of the candle, but the middle inverted image, which is smaller, duller, and less distinct than the others, moves in the contrary direction. In fact, unless we move the light steadily from side to side, it is difficult to see the centre inverted image at all. The anterior erect image is a reflection from the cornea, the posterior one (erect) is from the anterior surface of the capsule of the lens, and the middle, or inverted image, a reflection from the concave or posterior surface of the crystalline capsule. The anterior one is always seen as long as the cornea remains in a healthy condition; the posterior erect and the middle inverted images are lost if the anterior surface of the capsule or the lens itself be opaque, whilst only the middle inverted one disappears provided the posterior capsule alone be affected. The inverted and the deep erect images are very speedily obscured and then obliterated by lenticular cataract, whilst the images are unaffected in simple amaurosis. In making this examination the practitioner should face the window, and look downwards and backwards at the eye of the patient, who should be seated with his back to the light.

SECT. II.—GENERAL PRINCIPLES OF DIAGNOSIS.

Reserving special points of diagnosis for those chapters and sections where we shall discuss separate diseases and their varieties, I shall make a few general remarks in this place. I shall commence with the *types of vascularity*. In the inflammatory diseases of the eye the injected vessels occupy different *situations*, have different *extents*, and vary in *colour* and *arrangement*, according to the part involved. As regards situation, in the affections of the globe itself, the vessels

form a limited circle or zone around the cornea, evidently beneath the conjunctiva, whilst in conjunctivitis they are situated in the conjunctiva itself, and move with that membrane. Extent is of great importance in diagnosis; for whilst the uncomplicated inflammations of the textures of the eyeball are attended by a circle of vessels limited to the situation immediately surrounding the cornea, in general inflammation of the conjunctiva they extend over the whole conjunctiva of the eyeball and lids. Again, in both instances, as long as the cornea remains unaffected, the vessels never pass beyond the junction of the cornea and sclerotica, but in the inflammations of the cornea itself they transgress this boundary, and ramify to a greater or less extent on its surface.

In the arrangement of vessels four varieties have been distinguished, viz., the *reticular*, the *fascicular*, the *varicose*, and the *zonular*. The three first are peculiar arrangements of the conjunctival vessels, and the latter of the anterior ciliary. The term "reticular" is used to denote the vascular network which the numerous anastomoses of the main conjunctival vessels form in all the ordinary inflammations of that tunic. In all the severer inflammations the interspaces are filled up by smaller and less perceptible vessels, so as, in some cases, to give an uniform appearance. By moving the lids, these vessels are readily seen to follow the motions of the conjunctiva. Sometimes, however, the redness is limited to a mere *fasciculus*, or bundle of vessels, as occurs in acute strumous conjunctivitis, where a few irritable-looking trunks arrange themselves in a somewhat triangular manner. The apex of this triangle is at, or near, the edge of the cornea, being formed by a small acuminate vesicle, or (this having burst) ulcer, whilst the base spreads out in the conjunctiva oculi. The *varicose* vascularity is formed by the tortuous, enlarged, and distended branches, seven in number, which come from the recti muscles, which carry red blood, and are more or less marked in every healthy eye. This form is seen in the deep-seated and chronic congestions and inflammations of the globe. The last variety is the *zonular*, which consists of a circle (either uniform or especially marked in one or more points) formed by the accumulation of a number of exceedingly fine, small, straight, vessels (not branching or anastomosing) around the cornea, which terminate a short distance from the junction of the cornea and sclerotica, and, when intense, leave a white ring intervening. The vascularity is most marked towards the cornea, being gradually and imperceptibly shaded off externally. The conjunctiva may be moved over these vessels without disturbing their arrangement.

The *colour* of the inflamed vessels, and the kind of *pain* experienced by the patient, vary also in the affections of the globe and conjunctiva. The reticular and fascicular arrangements are *scarlet*, the varicose *purplish*, and the zonular *pink*, or a *pinkish salmon colour*. In conjunctival inflammation the pain is *superficial and burning*,

attended with a feeling of sand in the eye; whilst in the affections of the globe the pain is deep-seated and severe, occurs in paroxysms, and is accompanied by pain over the brow, which latter is always increased towards night.

It is sometimes necessary to distinguish *real* from *feigned* diseases, or *natural* from those *artificially* produced. Amaurosis is the disease most frequently feigned, and inflammation, with some of its effects, that which is most frequently produced artificially. In all suspected cases we must take into consideration the situation the individual holds in society, and the inducements he may have for deception. Such persons are usually either children, apprentices, members of benefit clubs, or soldiers and sailors, and deceive either to be freed from employments they dislike, to obtain money, or, in the latter case, to gain their discharge, or a higher pension than they would otherwise be entitled to.

In feigned blindness we may generally detect the imposition by the perfectly healthy appearance of all the textures of the eye, the absence of orbital and head symptoms, and the normal condition of the general health. Unless the impostor be acquainted with the properties of belladonna, hyoscyamus, &c., the pupil will be natural, and move readily from the alternation of light and shade. In all these cases both eyes are said to be affected, as the object of the individual would not be gained unless all useful vision were supposed to be lost. From the cat's-eye amaurosis of Beer, such cases may be distinguished by dilating the pupils by belladonna and viewing the fundus in different lights; from the other forms of amaurosis, by the absence of slight loss of correspondence in the axes, or of strabismus, which almost always accompanies severe cases; by the healthy character of the globes, freedom of motion in the irides, and the incorrect congregation of symptoms which the patient describes.

Where belladonna has been used the diagnosis is more difficult; here we should carefully avoid exciting suspicion in the mind of the person examined, lest he become alarmed and constantly on his guard. Where the individual really sees, and does not strive voluntarily to overcome the feeling, he will close the eye rapidly, or wink, if anything be brought near the organ, and which seems about to touch it; on the contrary, if he be blind, the lids do not move till they are actually touched, or the eyelashes disturbed. By engaging the person in conversation, he will sometimes direct his eyes at the countenance of the speaker, or in the situation of a third party suddenly appealed to, very different to the absent stare of the blind. Where detection is very difficult, Mr. Tyrrell (Treatise, vol. ii. p. 326) says that he has succeeded immediately by the following means: During conversation dropping something suddenly, which has been immediately picked up by the patient; pretending to see something curious in the room or out of the window, the patient has, for a moment, been unguarded, and his eyes have followed the direction

pointed to; asking how the patient's dress became torn or soiled, his eyes have immediately been directed to the part mentioned; and several other like expedients. In the case of a little girl, Mr. Tyrrell promised her sixpence if she would take her medicine well; she assented, and Mr. T. held out a halfpenny towards her, which she directly declared was not a sixpence, without touching it, although she had previously sat for hours together without moving, and would allow the finger, or other matter, to be brought in contact with the cornea without flinching. Keeping suspected individuals on short allowance for a few days, and then placing some tempting food in the room, leaving them alone for a short time, will often succeed.

When we have reason to suspect soldiers of artificially inducing inflammation or injuring their eyes, the suspicion will be naturally increased if the disease be almost exclusively confined to privates or non-commissioned officers, without either attacking the commissioned officers, the women, or children; also by the disease being confined to one eye, and that almost always the right. (Mackenzie's Pract. Treat. p. 522, edit. 3rd.) In some cases it is possible to detect the means employed. Acrid powders introduced between the lids produce a peculiar train of symptoms, and may often be found on some of the conjunctival folds. Mr. Marshall (Hints to Young Medical Officers, &c., p. 112) once detected a patient with a piece of black muslin spread over the cornea of the right eye. Acids act chemically on the conjunctiva and cornea, rendering them white and swollen, the changed part readily peeling off. The eyelashes also are sometimes plucked out, and caustic applied along the ciliary margins. M. Carron du Villards states (Guide Pratique, &c., p. 222) that he knew a man, unworthy of the name of a physician, who made an enormous fortune by artificially producing specks of the cornea in young persons liable to be drawn into the military service.

In forming a diagnosis of any disease, it is necessary to learn what are the phenomena or symptoms produced, and also that the practitioner be previously acquainted with the proper import of these symptoms. In the diseases of the eye, as in other cases, it is well to gather all the phenomena in a methodical manner, both what we can learn of the case by our own observation and what we gather from the description given by the patient and friends. *Objective* symptoms are such as we can learn ourselves, without one word of explanation from the suffering party, and consist of the *appearances* of the diseased parts, and of the *changes* which disease may have effected in them. *Subjective* symptoms, on the contrary, can be learned only from the patient himself and the friends who have constantly attended to his complaints, &c., and these consist of *sensations*, as uneasiness, pain, &c., and of disturbed *functions*, such as defective vision, appearances of motes or sparks flying before the eyes, and the like. Besides the mere local symptoms, it is necessary to inquire into what are termed sympathetic, those, namely, which are secondary to the original dis-

ease, and dependent upon it, such as the pain over the brow, &c.; and, secondly, into the general or constitutional disturbance, with the state of the vascular and nervous systems. Of these various symptoms some are expressive of their nature, and some only of the parts they occupy. The first, as Dr. Latham states (*Medical Gazette*, vol. 3rd, p. 152), flow directly from their essence; the second are derived from the disturbed functions and sensations of particular organs. This distinction between essential and accidental symptoms is of great practical importance; essential symptoms being placed within the scope of clinical diagnosis, and within the compass of rational treatment. Accidental symptoms only discover where they are, not what they are, or how they are to be treated. For example, we may learn that the conjunctiva is inflamed from the ordinary local and general symptoms; but we must consult the colour and appearance of the blood-vessels, and the state of the general health, to arrive at proper indications for treatment. So also in amaurosis, the defect of vision informs us that the visual nervous system is the part suffering; but we must consult more definite symptoms to know how to treat it; for in one case it may be necessary to bleed generally, and to place the patient on a strictly antiphlogistic regimen, whilst in another nutritious diet, malt liquors, and tonics, are equally demanded.

Hence, when notes of cases are taken, I have found the following plan advantageous:—First, to learn as much as possible of the patient's *previous history*; secondly, to inquire into the preceding and *incipient* symptoms; thirdly, to learn all that is known of the *predisposing* and *exciting* causes; fourthly, to examine into the *present* symptoms, arranging them into *objective* and *subjective*, viz., *local appearances* and *changes*, *sensations*, and *functions*; the constitutional into *febrile* and *sympathetic*, with the conditions of the general *vascular* and *nervous* systems; fifthly, to make an attempt at *diagnosis*, and the ascertainment of the *pathology*; sixthly, to gather from this the indications for *treatment*; seventhly, still further to trace the case under the headings of *progress*, *results*, and *terminations*, the general and local *effects of treatment*, and the mode and peculiarities of the employment of *remedies*.

SECT. III.—LAW OF IDENTITY.

Whenever both eyes become simultaneously or consecutively diseased, they are subjected to a general law, viz., that of an exact identity in the parts affected in both eyes, and in the character of the diseased actions; whether the disease arises from some general cause, which engages both organs at the same time, or from sympathy, as it is termed, of one globe with its fellow; or whether it arises from injury or idiopathic derangement. This law will be found to regulate the simultaneous and consecutive affections of the globes in three particulars:—First, that the identical tissues, or parts, are engaged;

second, that the very identical portions of such tissues, or parts, suffer together in these diseases ; third, that the characters and peculiarities of morbid phenomena are also analogous or identical.

These facts apply to all and every disease of the eye, so that a few illustrations will be sufficient. If we take a case of conjunctivitis which has attacked both organs, we find that the characters of the disease are similar in both, for they agree in vascularity, secretion, pain, &c., and similar parts are simultaneously affected. We have proof of this in cases where portions only are diseased, such as happens in palpebral conjunctivitis, for in both eyes the conjunctiva of the lids suffers without inflammation of the conjunctiva oculi. If a cataract form in one eye, we know that a cataract, and not any other form of disease, will appear in the other ; or, if we find a soft whitish cataract in one, it is sure to be identical in the fellow eye ; if dark in one, it will be dark in the other ; if the capsule only be opaque in one, it alone will be opaque in the other ; but if both capsule and lens be diseased in one, there will be a capsulo-lenticular cataract in the other. Again, if the posterior or anterior surfaces of the capsule alone be affected in one eye, the disease corresponds in the opposite organ ; so, also, if the opacity be in spots or streaks, or uniformly diffused, or commences either in the nucleus or circumference of the lens, it presents the same appearance, and follows in the same course, when the second eye becomes cataractous.

Where an eye has suffered from a severe injury, or has been lost from inflammation, if the disease remain unsubdued for any length of time, sympathetic disease is apt to be set up in the opposite organ, of a most insidious and dangerous kind ; but it follows in the steps of the primary ailment most faithfully and exactly. Dr. Mackenzie of Glasgow has written an interesting paper on what he terms "sympathetic ophthalmia," illustrated by cases, the symptoms of which he considers to be chiefly those of iritis, and thinks that the designation of "sympathetic iritis" would correctly indicate their nature. The law of identity applies to all the pathological conditions of the organs of vision, and is by no means confined to injuries of the globe or of any particular tissue ; hence the restriction of these terms to the cases of sympathetic disease under discussion is not only prejudiced and partial, but absolutely incorrect, inasmuch as the iris is often perfectly unaffected.

The longer the disease, or the inflammation and irritation arising from the injury, remain in the organ first affected, the greater is the danger of its involving the second in similar actions, and hence, if the organ becomes completely quiet and atrophic, the second often escapes. In staphyloma we remove the source of irritation, existing in the unnatural projection, and evacuate the lens, with some portion of the vitreous humour, in order to save the opposite eye. Moreover, the second eye is rarely implicated, unless the disease be severe and protracted—so severe, in fact, as to destroy or most materially injure the functions of

the parts attacked, and so prolonged as to occupy months in its destructive career. Forgetting these facts, it has been strongly insisted upon that the sympathetic inflammation was of a peculiarly insidious and dangerous kind, as if it differed in these respects from the primary affection, which, in fact, it follows most correctly and faithfully, proving that such as the primary affection is, such will be the future—that if the superficial parts of one globe be alone involved, they alone will be attacked in the second; if the deeper tissues have suffered, they will also suffer in the sympathetic disease; and that if the whole globe was more or less affected, the opposite eye will be similarly affected sympathetically. I may now, in conclusion, inquire, What are the reasons of this peculiar sympathy, and what the causes continually in operation?

Symmetrical parts of the body are connected by a peculiar bond of union, both in their primary development and in their diseases, when such affections arise from constitutional causes. The two eyes, however, suffer together when the disease has no connection with the state of the system, as well as when it is manifestly the originating cause, proving that although their sympathetic connection may be strengthened by constitutional causes, it is distinct and independent, and a power which binds them to one another by a much closer tie than is exhibited by any other two organs in the body. Every individual has a constitution peculiar to himself, be it healthy or diseased, under the influence of which any two inflammations originating in the body would probably exhibit an identity in character and peculiarity, especially when we bear in mind, that the same predisposing causes are in operation. This consideration, with the intimate vascular and nervous communications which exist between the two eyes, may perhaps account for the law of identity which connects the tissues in so remarkable a manner with each other.

SECT. IV.—VARIETIES AND CHARACTERS OF INFLAMMATION.

In the inflammatory affections of the various tissues of the eye I shall have to speak of *active* and *passive* inflammations, of *acute* and *chronic*, of *irritative*, *healthy*, and *unhealthy*, *common* and *specific*; and I would explain the meaning I attach to these terms: they involve no theory whatever of the pathology of inflammation. I mean to assert that inflammation may assume either an active or passive form in any organ or part from either constitutional or local causes, or from the specific nature of the exciting agent, being distinguished from each other by constitutional and local symptoms. In the active form there is bright scarlet vascularity, tension, pain, heat, actively disturbed functions, and pulsation; in one form of the passive, dark purple or livid discoloration, distension of vessels without pulsation, considerable swelling and relaxation, rarely tension, rarely much heat or pain; whilst in another, which comes on in very reduced states of the sys-

tem, many of the objective symptoms are nearly similar to the active type, but there is much less pain, and nervous excitement, usually with great rapidity in the progress of the disease. The constitutional symptoms, in the first case, are those of synocha, or inflammatory fever; in the second, either depression and derangement of the general health without fever, or a type of fever below the standard of inflammatory, with every intermediate grade to complete prostration of strength and typhus. It will be obvious that in this sense the terms active and passive denote only the *character* of the inflammation, and hence have no reference to its duration. I restrict the terms acute and chronic to the *duration* of the disease, and in like manner, as in the former instance, mean to denote no character it may possess; for however slow an inflammation may be, it may be active in its characters, or however rapid, it may still present passive features. Irritative inflammation denotes an excess of nervous irritation in the inflamed parts, and is often connected with a tendency to hectic fever, as in the peculiar conjunctivitis of nurses who are suffering from undue lactation, and in strumous or phlyctenular conjunctivitis. The terms healthy and unhealthy, common and specific, refer to the process as seen in normal and abnormal conditions of the health, the latter to inflammation modified by some specific cause, as gonorrhœa, rheumatism, syphilis, or scrofula, &c.

Instead of contending about the presence or absence of increased action, or of weakness in the capillaries, it would be much more to the purpose if we considered the actual combination of morbid states which constitutes inflammatory orgasm. Lesions of innervation and of circulation are always combined, and the consequences are lesions of nutrition, whether the primary aberration from the natural condition of nervous state arise from injurious matters circulating with the blood, or other disturbances of the same, or originate in causes acting on the nervous system, and secondarily affecting the blood-vessels and blood. The characters of an inflammation, when of sufficient extent, determine the phenomena of the constitutional disturbance; still, very rapid and destructive inflammations may progress during great prostration or a typhoid condition of the system.

SECT. V.—GENERAL PRINCIPLES OF TREATMENT.

The considerations which I wish to impress especially on the minds of my readers, are that diseases of the eye require the same principles of treatment as they would require if situated in any other part of the body, employing a common-sense view of the case, and not a mere routine list of remedial measures; in fact, to treat diseases of the eye successfully, it is as essential to be guided by age, sex, peculiarities of constitution, conditions of the general health, local derangements or diseases, as well as the character, duration, &c. of the ophthalmic affection, as it is in diseases of any part or of the whole body. The

use of general blood-letting is beautifully seen in conjunctivitis and iritis, &c., of active character and acute type, but is as hurtful in atonic conditions of the system, and in passive cases, as it would be in some forms of erysipelas, &c. Carrying general and local detractions of blood to an unnecessary extent is often highly injurious by greatly protracting the period of convalescence; hence, in many of these cases, the patient is most rapidly cured by tonics and good diet, who would have gone on for months and months under the treatment of some routine or bigoted practitioner. Even in these examples we can only judge what is the best plan of treatment by attending to the actual conditions of the case, the history, and the general and local symptoms. We may meet with two cases of ophthalmia of equal duration, but we must not on that account pursue a routine course for "chronic" inflammation; for one case may present passive features, with a deranged and depressed condition of the general health, whilst the other may be active, with inflammatory fever. A routine practitioner does not trouble himself about these differences,—he either depletes or stimulates both; one is cured, whilst the other is rendered inveterate under his hands.

An important fact, however, to be borne in mind is, that many ophthalmic inflammatory affections are surprisingly benefited by a change of treatment, when the same measures have been continued for any length of time. Numerous cases will get well under a simply soothing plan, which have resisted strictly antiphlogistic and stimulating measures for a long time previously.

As regards local applications, strong solutions of the nitrate of silver, or this remedy in substance, applied to the conjunctiva, invariably do harm, and are highly censurable except in purulent conjunctivitis, with an abundant secretion, and even in this disease I have found strong astringent solutions, at all events, equally efficacious. The application of the nitrate of silver to the *outside* of the lids, which I have recommended in many cases of simple and complicated conjunctival disease, is a very different plan of proceeding to its direct introduction between the lids. I have seen the greatest injury result from the latter, and, if myself the patient, should decidedly refuse my consent to be so treated.*

* Mr. Walker remarks (*Oculist's Vade Mecum*, p. 68) that "Mr. Higginbottom, the author of a valuable work on the use of nitrate of silver, recommends the application of this substance to the outer surface of the palpebræ. This mode of applying nitrate of silver has also recently been advocated by Mr. Wormald and Dr. Hocken in the treatment of some forms of ophthalmia. This would be very proper if we could not obtain access to their conjunctival surface; but as this can always be accomplished without difficulty, it is obviously the part to which the remedy is to be applied."

In the first place, Mr. Walker cannot have looked carefully through Mr. Higginbottom's Essay, in which he nowhere recommends the remedy *for diseases of the eye*, although he uses it in erysipelas of *the face*, and mentions applying it to an ulcer *near the eye*. In the second, it is obvious that he (Mr. Walker) has never tried the application of the remedy to the outside of the lids for the cure of superficial affections of the eye, much less instituted a careful

Weak solutions of the nitrate of silver (as one or two grains of the salt to an ounce of rose-water) are, however, often beneficial as local applications in many superficial affections.

As I shall have to mention individual remedies, their indications, strengths, mode of use, &c. &c. hereafter, I shall omit any allusions to them here, since it would be an unnecessary repetition to consider their general indications apart from the diseases in which they are used.

In conclusion, I would remark, that whenever the lids adhere from the conjunctival secretion drying on the tarsal margins, either a simple or a slightly stimulating ointment should be occasionally smeared along them to prevent this occurrence. Belladonna, also, should be used in all the simple and compound inflammatory affections of the iris, to dilate the pupil, and to prevent or remove adhesions to the crystalline capsule, smearing it in the state of moistened extract over *the brow* whenever there is much *irritability* of the eye and conjunctiva, or dropping a solution *between the lids* when these morbid conditions are *absent*.

CHAPTER II.

SECTION I.—PATHOLOGICAL CONDITIONS OF THE CONJUNCTIVA. GENERAL OBSERVATIONS.

DISEASES of the conjunctiva form a large proportion of the ailments for which patients apply at an ophthalmic institution, constituting, with the affections of the lids, lachrymal apparatus, and parts connected, at or about two-thirds of the sum total of all the cases entered in the books. I have collected the statistical records of the West of England Eye Infirmary, the Royal London Ophthalmic Hospital, the Birmingham Eye Infirmary, the Manchester, Glasgow, and Edinburgh Eye Infirmaries, the tables of which I subjoin, furnishing a rough estimate of these facts.

It will be seen from these computations, that the smallest average proportion of the whole number of diseased appendages to the sum total of cases entered in the books, is about three-fifths of the number; and taking into consideration the proportion in the larger institutions, I think that two-thirds scarcely exceed a fair average, especially when we reflect that many of the slighter cases are not entered at all.

comparison between the injurious and beneficial effects of its application to the conjunctiva and to the integuments of the lids, and therefore cannot be a competent judge of their respective value. According to his own showing its application to the conjunctiva occasions severe suffering to the patient, "which usually continues from half an hour to three or four hours" (p. 15). According to our own experience it often occasions severe inflammation of the membrane, and most intractable granular change, unless there be a free discharge, and much judgment and care be employed—especially if it be frequently repeated, or strong solutions of the nitrate or unguents be used. From all these evils the external use is free, and, at the same time, I am fully convinced that all the benefits are obtained.

WEST OF ENGLAND EYE INFIRMARY.

Year.	Total No. of Cases Admitted.	Inflammation of the Conjunctiva.	Diseases of the Lids.	Epiphora.	Dis. of the Lachrymal Apparatus.	Total No. of Diseased Appendages.	Proportion.
1837-8	1004	460	205	3	25	693	2-3rds.
1838-9	957	456	171	5	28	660	2-3rds.
1839-40	1059	485	229	3	20	737	2-3rds.
1840-41	906	394	189	6	25	614	2-3rds.
4 years.	3926	1795	794	17	98	2704	2-3rds.

ROYAL LONDON OPHTHALMIC HOSPITAL.

Year.	Total No. of Cases Admitted.	Inflammation of the Conjunctiva.	Affections of the Lids.	Pterygium.	Dis. of the Lachrymal Organs.	Total No. of Diseased Appendages.	Proportion.
1838	4774	2933	679	4	86	3162	2-3rds.
1839	4791	2874	580	4	86	3544	2-3rds.
1840	5255	3147	734	..	74	3959	2-3rds.
3 years.	14,820	8954	1993	8	246	10,665	2-3rds.

BIRMINGHAM EYE INFIRMARY.

Year.	Total No. of Cases Admitted.	Inflammation of the Conjunctiva.	Affections of the Lids.	Dis. of the Lachrymal Organs.	Miscellaneous.	Total No. of Diseased Appendages.	Proportion.
1836	809	475	133	21	3	632	2-3rds.
1837	872	369	89	15	4	477	1-half.
1838-9	2229	990	182	46	278	1496	2-3rds.
4 years.	3910	1834	404	82	285	2605	2-3rds.

MANCHESTER EYE INFIRMARY.

Year.	Total of Cases Admitted.	Conjunctival Inflamm.	Pterygium.	Affect. of Lids.	Affect. of Lachrymal Organs.	Echymosis.	Tumour in Canthus.	Epi-phora.	Total of Diseased Appendages.	Proportion.
1839-40	1837	796	3	172	0	1	2	3	977	1-half.
1840-41	1756	779	—	162	23	..	..	3	967	3-5ths.
1841-42	1499	713	2	118	19	..	..	..	852	3-5ths.
3 years.	5092	2288	5	452	42	1	2	6	2796	3-5ths.

GLASGOW EYE INFIRMARY.

Year.	Total No. of Cases Admitted.	Conjunctival Inflammations.	Affections of the Lachrymal Organs.	Affections of the Lids.	Total No. of Diseased Appendages.	Proportion.
1839	966	450	13	75	533	3-5ths.
1840	966	504	24	78	606	2-3rds.
1841	844	438	19	71	528	2-3rds.
3 years.	2776	1392	56	224	1672	3-5ths.

EDINBURGH EYE INFIRMARY.

Year.	Total No. of Cases Admitted.	Conjunctival Inflammations.	Affections of the Lids.	Affections of the Lachrymal Organs.	Total No. of Diseased Appendages.	Proportion.
1841	446	120	82	8	210	1-half.
1 year.	446	120	82	8	210	1-half.

The conjunctiva offers frequent examples of all the diseases and affections to which mucous membranes and muco-cutaneous surfaces are exposed. We may witness simple congestion, or hyperæmia, without inflammation; hyperæmia with hæmorrhage; anæmia; simple inflammation, active or passive, acute, subacute, or chronic, partial, or general; catarrhal inflammation; purulent inflammation, acute and chronic; gonorrhœal inflammation; strumous inflammation; pustular inflammation; exanthematous inflammation; granular inflammation; ulceration; fungous growths; adhesion (symblepharon); opacity and thickening; polypoid, warty, malignant, and other tumours; pterygium; wounds, and impaction of foreign bodies; œdema; ecchymosis; emphysema of connecting cellular tissue; abscess of subconjunctival tissue; injury and inflammation from caustic or irritant substances; irritation from lachrymal concretions; morbid dryness, and cuticular change; staining from nitrate of silver; scalds and burns.

These diseases and pathological states of the conjunctiva are most of them of daily occurrence, and form, as I have shown, the great bulk of ophthalmic treatment. Some forms are confined to the palpebral conjunctiva, some to the ocular portion of this membrane, whilst others spread to and involve the whole tunic. In its inflammatory affections we see every grade of the process from the mildest to the most rapid, from the most acute to the most chronic, and from the most active to the most passive. The reasons are obviously dependent on the nature and intensity of the exciting causes, the great diversity of constitution, the dissimilarity of age, sex, and temperament, idiosyncrasy, and predisposition. An exposure to damp and cold will produce in one man acute inflammation and abscess of the tonsils of an active type, and in another a passive inflammation of the soft palate, uvula, and tonsils (relaxed sore throat); so, in like manner, a similar exposure will occasion in one person an inflammation of the conjunctiva exactly similar to the latter form of sore throat, and in another an inflammation of the most active and acute characters.

Diseases of the conjunctiva, moreover, attack all ages, from the infant just born, or even in utero, (for some are congenital,) to the old man bending under the weight of years, and sinking gradually into the grave from climacteric decay; all constitutions, from the most plethoric to the most depressed, from the most healthy to the most diseased or deranged; occur in all climates, especially, however, in those which are variable and damp, sparing neither sex nor species.

Connecting links are not wanting to show the relation of conjunctival diseases to one another; for we pass from simple inflammation to its modifications by specific constitutional conditions, as struma, small-pox, &c., to catarrhal inflammation, to purulent inflammation, and from this to the granular. In fact, to understand diseases of the eye philosophically, and treat them rationally and with great success, it is necessary to be thoroughly acquainted with the laws of health and disease of the body generally, to possess an enlarged and unprejudiced

knowledge of the applicability of remedies, to use a considerable portion of common sense, and not be blinded by terms, since ophthalmic pathology is rarely anything more than an individual illustration of disease, as seen in other situations, and of general laws possessing a general influence;—in no instance to adopt a routine practice for a name, but always to adapt remedies to the actual pathological condition, and by no means to treat an inflammation of the throat and of the conjunctiva differently, if they agree in character, occur in similar constitutions, sexes, ages, &c., and have not been already modified by treatment, merely because one is called cynanche, and the other ophthalmia.

The exciting causes of conjunctival disease are either strictly local or constitutional; the more acute affections generally owing their origin to exposure to atmospheric vicissitudes, mechanical or chemical injury, or to specific contagion; the more chronic to constitutional derangements, with or without congestion of the vessels of the head generally, excessive snuff-taking, or the abuse of wine and ardent spirits.

SECT. II.—ON THE APPLICATION OF THE NITRATE OF SILVER TO THE OUTSIDE OF THE EYELIDS.

SOME time since, I gained from Mr. Wormald the idea of applying the nitrate of silver to the outside of the lids. It was from watching the success of this practice in many cases that I was led to give the remedy, applied in this way, a fair trial among mine own patients. I found that it was most successful in strumous conjunctivitis, so much so, that, when combined with appropriate constitutional measures, it never failed in my hands,—and this not after the lapse of a protracted period, but after a few hours in recent cases, and after two or three applications in the chronic. At the West of England Eye Infirmary strumous conjunctivitis is very common, and often most severe and intractable. At my request, Mr. Delagarde (senior surgeon to the institution) placed several cases under this plan of treatment, and, soon after commencing it, he informed me that, out of at least a dozen such cases, there was only one which was not immediately attended with the most marked success. I have also found the external application of the nitrate a most valuable auxiliary in many of the diseases of the conjunctiva, lids, and cornea, as I shall hereafter explain in detail. On visiting the West of England Eye Infirmary, in the autumn of 1843, I found that this plan of treatment had been extensively adopted, ever since the time I first explained its proper indications, and with the most encouraging results.

Mode of applying the nitrate of silver.—A clean piece of the stick of nitrate of silver should be selected, having from one to two inches exposed. The patient's eyelids are then to be closed, and put slightly on the stretch, by applying the thumb of the left hand to the eyebrow,

and gently raising the skin. The nitrate, having previously been very slightly moistened, is now to be passed over the surface of the skin of the upper eyelid, and subsequently the lower one, once, or at most twice, smoothly, rapidly, and without pressure. The remedy is to be held obliquely during its application, so that the free extremity of the stick points obliquely upwards and to the nose, when used for the right eye, and obliquely upwards and outwards for the left, beginning at the outer canthus for the right eye, and the inner for the left, and carrying the nitrate straight on to the extremity of the lid. In this way the sides of the stick of lunar caustic will be brought in contact with the surface, so as to act on a sufficiently extended portion, the point not being used at all. In acting on the lower lid, however, it is sufficient to draw the stick along the skin backwards,—viz. from its attached part to its point. In performing this most simple operation, care should be taken to apply the remedy sufficiently near to the ciliary edges of the lids, as I have found much of its beneficial action lost by blackening the skin at too great a distance from them. The object of this application is only to blacken the surface to which it is applied, and not to occasion any severer effects; and it will be found that, as soon as the remedy has had time to produce its peculiar action on the subjacent nervous and vascular tissues, especially on the terminal filaments of the fifth nerve, it will completely relieve the intolerance of light and pain, the lachrymation, and the spasmodic condition of the orbicular muscle.

In the majority of instances, the careful and slight application of the nitrate produces merely slight uneasiness, stiffness, and sense of itching, which pass off in a few minutes. Where the skin of the eyelids is unusually sensitive, either from its being naturally delicate and irritable in the very young subject, or from the nature of the disease, this sensation may amount to actual pain, varying in degree in different instances, and remaining a longer or a shorter period. In all such cases, I now make it a rule to moisten the lids, and not the nitrate. When closed, and put on the stretch, as I have previously mentioned, they are to be moistened with a piece of lint, moderately saturated with clean water, followed by the nitrate in the manner already explained,—passing it over the surface *once* lightly and rapidly in the dry state, as I have found, from practical experience, that it acts less powerfully and energetically in this way than when the caustic has been moistened previous to its application.

Indications.—In describing the indications for applying this remedy in a few words, I may state that I have found it much more efficacious and certain in the active types of conjunctival and corneal disease than in the passive, and in those in which nervous irritation preponderates, than those in which it is almost, or altogether absent. It seems to possess a peculiar power of allaying the excessive irritability, and of subduing the existing irritation of the terminal filaments of the ophthalmic division of the fifth pair of nerves which exists in these cases;

since intolerance of light, pain, and excessive lachrymation are prominent features in both these classes of disease. On the contrary, should the symptoms of nervous irritation be absent,—viz. the pain, intolerance of light, and lachrymation, &c.—the nitrate will be found to produce comparatively but little benefit, or will even fail entirely in effecting the desired object.

Such are its general indications; and I shall leave the subject of its special applicability in particular diseases, till I describe these under their individual headings.

A similar application of the *tincture of iodine* to the integument of the eyelids has been much praised by Dr. Furnivall, physician to the General Infirmary, Hertford. He was induced to communicate his mode of practice, from the perusal of my papers on the external use of the nitrate of silver in strumous, and other forms of conjunctivitis. In a letter to the editor of the *Lancet*, Dr. Furnivall remarks, "Having been for many years in the habit of prescribing for cases of conjunctivitis, (chiefly strumous, and therefore the most obstinate usually,) and having enjoyed many opportunities of watching these distressing cases amongst the numerous out-patients of the Infirmary at this place, I would beg to recommend to Dr. Hocken a trial of painting the palpebræ of the affected eye, or eyes, with the alcoholic solution of iodine, commonly called Træ: Iod. For very fine-skinned children the strength may be lowered. I was led to apply this remedy thus, by reflecting on the continuity of surface between the skin and conjunctiva; and truly the effects have been beneficial in an extreme degree. The distressing lachrymation is immediately relieved; and I have had reason to think that in several cases I have stopped ulceration of the cornea. The remedy is easily applied; it dries on, gives no trouble, and requires some two or three applications every week, according to its effects. In the first stage, leeches have almost always been premised; but most of the cases have been brought before me in a very advanced and intractable state, when no leeches were requisite."*

Having myself always found the nitrate of silver successful, when judiciously and carefully used, I have not tried the tincture of iodine, although I have no doubt of its value, especially as very favourable reports have been made to me by gentlemen who have employed it. It cannot, however, I think, possess any superiority over the argenti nitras; and therefore, however valuable, it will not be found so useful to the busy practitioner, not being either so portable or so easily applied. Few medical men are without a caustic-case, containing some of the stick of nitrate of silver, constantly about them; but few indeed are provided with a bottle of the tincture of iodine and a camel's-hair brush. From these circumstances, the facility of prompt use alone would give a decided superiority to the nitrate. Thanks are undoubt-

* *Lancet*, vol. i. 1842-3, pp. 405-6.

edly due to Dr. Furnivall for his valuable suggestion; but I feel persuaded that, if attention be paid to the points I have mentioned, there will be no need to part with a tried and established remedy for one whose mode of action is no doubt essentially similar.*

SECT. III.—MODE OF APPLYING "DROPS," COLLYRIA, &c. TO THE CONJUNCTIVA.

The lower eyelid should be drawn down, and partly everted through the medium of its integument, and the remedy be either dropped into the sulcus formed between the conjunctiva oculi and conjunctiva palpebralis, or applied, by means of a camel's-hair brush, to the inner surface of the lid. If an ointment, it must be liquified by heat previous to its being used in this manner. In a short time the substance employed becomes diffused pretty equally over the whole conjunctival surface, from the motions of the eye and lids, and acts as beneficially as if it had been more generally applied in the first instance.

It is in general the best plan for the practitioner to apply "drops" or ointment to the patient's eye himself. Mr. Walker has judiciously remarked,† that if we prescribe a stimulating lotion or ointment, but little good can be expected to result from its use, if it be not brought into actual contact with it; and, as we know how seldom applications of this kind are properly used by patients, there is the greater necessity for the surgeon himself to apply something frequently on which he can depend to produce the proper impression. If we intrust their application to the patients or their friends, strict injunctions should be given as to their efficient use.

When there is an abundant secretion from the conjunctival surface

* I might also remark, that the nitrate of silver seems to possess an almost equally beneficial action when applied to the skin in the immediate vicinity of other inflamed or irritable mucous membranes. My opinion was requested by a medical gentleman some months back (1843) on a patient of his, who had been under his care for about four months. It was a case of gonorrhœa, which had existed about eight months before it came under the care of the gentleman alluded to. The patient was a young man of full habit, a wine-merchant, and tolerably fond of good living. Almost every plan of treatment that could be thought of had been carefully tried, and had failed over and over again; and at the time of my seeing him there was still a considerable discharge of thick yellow pus from the urethra, much pain in making water, and occasional attacks of chordee. By my direction, the nitrate was applied along the under surface of the penis, as far as the scrotum, and also slightly behind it. I again saw this gentleman about three days afterwards, when he informed me that he was better than he had been for months, that the discharge was nearly gone, was serous, and that he had no pain in making water. Since that period, I have not seen either the patient or his medical attendant, and am therefore unacquainted with the termination of the case; but I left him with an understanding that he was to paint over the course of the urethra with the tincture of iodine about twice a-week, according to circumstances, or until all the symptoms were removed.

† Oculist's Vade Mecum, p. 15.

it is necessary to wash away the discharge by means of a syringe, used gently, previous to the application of stimulating or astringent solutions.

When a collyrium is ordered, it should, in most instances, be applied freely to the outside of the eyelids, as well as introduced between them to the conjunctiva. Patients, however, are much more likely to attend to the former injunction than to the latter; and hence it is necessary to explain especially the mode in which they should proceed, in order to insure its reaching the conjunctival surface.

I will now pass on to consider the individual affections of the conjunctiva.

SECT. IV.—VASCULAR DISTURBANCE WITHOUT INFLAMMATION.

Under this head I intend to consider, 1st, simple vascular fulness; 2nd, deficiency of blood; thirdly, hæmorrhage from the conjunctiva.

Conjunctival hyperæmia is an important symptom in many of the diseases of the eye, as I shall have hereafter to explain, and in many other affections connected with determination of blood to the head. We look at the conjunctiva for information in apoplectic subjects, in fever, or inflammatory disorders of the brain, and are often called on to prevent active congestions from passing into the stage of inflammation, when occasioned by mechanical injury or irritation.

Anæmia, also, is a valuable criterion in affections of the head dependent on exhaustion; one frequently resorted to in the diagnosis of amaurosis, and as a guide, amongst other symptoms, for treatment.

Hæmorrhage from the Conjunctiva (vide Author's Paper, Med. Gaz. vol. ii. 1839-40, p. 837).—It would seem that hæmorrhages are most likely to occur spontaneously from mucous membranes, being, in the generality of cases, the result of transudation through the coats of the blood-vessels and the investing membrane, or more rarely from direct rupture of some vascular branch. When depending on transudation, the condition necessarily supposes a pre-existing condition of capillary hyperæmia, which may be either active, passive, symptomatic, or sympathetic, and either active or passive in its local and general symptoms, with every intermediate shade. As all the mucous membranes are predisposed to spontaneous hæmorrhages, so those are especially which are most active in their functions, and receive the largest vascular supply; hence the frequency of hæmoptysis, hamatemesis, and melæna, and the comparative infrequency of hæmorrhage from the conjunctiva. That hæmorrhages occasionally do take place from the conjunctiva the following cases will prove:—

CASE 1.—A delicate, strumous child, about four years old, during the spring months of 1838 became affected with a severe catarrh. There was cough, coryza, and slight fever. At the same time both eyes were congested, and there was a slight catarrhal discharge from the conjunctivæ. On seeing the child one morning I discovered that

blood was slowly escaping from between the lids, and learnt from the mother that one or two teaspoonfuls had already been lost. The conjunctivæ presented an ecchymosed appearance. By a gentle local astringent this was readily suppressed, and did not recur during the continuance of treatment.

CASE 2.—An infant was brought to the West of England Eye Infirmary, suffering from purulent ophthalmia, which had existed several days; but, although there was considerable discharge, yet the corneæ of both eyes were sound and transparent. One morning of admission the mother brought the child into the room in great alarm, stating that the eye was bleeding. In this case blood slowly trickled from between the lids, mixed with the discharge. The conjunctivæ were deeply injected, and presented the appearance of ecchymosis, as in the former case.

Remarks.—In both these cases hæmorrhage was the result of active congestion, and connected with a morbid increase of secretion from the mucous tunic, the membrane being placed for a time in that condition which I have before stated as predisposing to hæmorrhage by transudation. Although I have not met with a case, yet I have no doubt that passive transudation might result from the conjunctiva in those conditions of the system, where hæmorrhages take place from so many parts of the body.

In the "London Medical Gazette," (vol. i. 1840–41, p. 32, No. 1, Sept. 23, 1840,) a gentleman, signing himself "Lector," remarks, that "the two cases of hæmorrhage from the conjunctiva detailed in a recent number of the 'Medical Gazette,' by Dr. Hocken, of Exeter, are curious and interesting. They appear, however, fortunately, to have been slight, and easily suppressed. My acquaintance with the records of medicine is too limited to enable me to say whether they contain many such cases; but in the course of my reading, some years ago, I observed one or two remarkable cases of bleeding from the eye, the notes of which I subjoin.

The first is from the works of Forestus, (Foresti Opera Omnia; Frankfurt, an. 1634, lib. 2nd, De Morbis Oculorum et Palpebrarum,) obs. xiii. "De sanguine per tres fere septimanas ex oculis lachrymarum instar copiose emanante et profluente." Forestus saw this patient on the 23rd of April, 1581, being an old woman, ætat. 80; it was connected with jaundice. The eyes were not painful, except that they were opened with difficulty in the morning from the flow of blood. The second is by the same author, given by Dodonæus. A young girl, aged 16, whose menses had not appeared, but in whom a vicarious discharge took place from the coats of the eye. The third is from the "Phil. Trans.," No. 208, p. 51, an. 1694, being "part of a letter to Dr. Clopton Havers, F.R.S., giving an account of an extraordinary hæmorrhage at the glandula lachrymalis."

"Sir,—Since my coming to this place I have met with a very strange case. An icteral discontented woman, having a desire to die,

wholly rejected the help of medicine, and within three months, being well nigh her end, there happened an eruption of blood out of the glandula lachrymalis of one of her eyes, without any external injury. There was an evacuation of two pounds of blood within the space of thirty hours. About a week after the same sluice was opened again, and she bled till she died. Now, I would fain know what blood-vessels come to that gland from which such a vast quantity of blood should be cast forth in so short a time."

These hæmorrhages are apt also to occur in hysterical young women. Dr. Laycock (*Nervous Diseases of Women*, &c., p. 220,) says from the eyes, ears, and inner canthi. In a cook, named Burns, bleeding took place from the inner canthi, after depletion for epilepsy and giddiness, which had existed from puberty. The menses were suppressed, and there had been pain and dimness of sight in the right eye since the bleeding.

I saw a patient who laboured under a most troublesome trickling of blood of this kind; it came from a small fungous growth projecting from the conjunctiva of the upper lid of the right eye. She was about twenty-three years of age, very hysterical; but the catamenia were regular. The bleeding recurred every morning, and lasted for several hours, whilst no treatment seemed to influence it in the slightest degree.

An interesting example is narrated by Dr. Kersten, of Magdeburg (*Rusts' Mag.*, bd. 58, heft. 1), who remarks that there are two sources whence the blood flows in these cases; either there is a real secretion of bloody tears by the lachrymal gland, which is a very unusual occurrence, or hæmorrhage takes place from the conjunctiva of the globe or eyelids, or from the caruncula lachrymalis. It was from the latter source that the blood flowed in Dr. K.'s case, a girl of eighteen. She was a child of phthisical parents, and had but indifferent health during her childhood. When twelve, she received a wound over the left orbit, so small that it left no scar visible. Soon after blood began to flow from both eyes, and continued fourteen days, in such quantity as rendered her very weak, recurring every four weeks. When sixteen, the preliminary signs of menstruation occurred without any uterine secretion, the hæmorrhage continuing to recur with great regularity. A physician who saw her at this time stated that the bleeding came on with regularity at ten A.M., and at four P.M., at each of which periods it continued for half an hour, and recurred daily for a fortnight. The blood issued in drops from the cornea of each eye, but during its flow the patient sometimes fainted. Pain in the head and eyes, a hard pulse, and considerable radiated redness of the conjunctiva, accompanied these attacks. The patient also asserted that during their continuance all objects seemed to her of a red colour.

After the preliminary symptoms had continued for some time, menstruation occurred, and the hæmorrhage ceased; this amelioration, however, lasted but a few months, the menses continuing, but the hæ-

morrhage from both eyes returning; and in November, 1839, she came under Dr. K.'s care. Her face was then covered with blood, which flowed constantly from between the lids, and she was unable to open the eyes, owing to great intolerance of light. She was extremely weak, but quite sensible, and her pulse small and feeble. At that time the hæmorrhage observed a cycle of three days, continuing for that time, then disappearing for three days, and then once more recurring. In the intervals the conjunctivæ were red and tumid, the corneæ cloudy, and the eyes intolerant of light. When the blood was flowing, its source was evidently the caruncula lachrymalis and the conjunctiva, and in the course of three days the quantity amounted to eight or ten ounces. The patient's general health was much impaired, and she had an anæmic and leucophlegmatic appearance.

She continued only ten days under Dr. K.'s observation, but at the end of a year he saw her again. During the interval her general health had much improved, and the hæmorrhage occurred much less frequently, and no longer at regular intervals, sometimes not for three weeks. She remained in the hospital eighteen days, during which time it occurred once to the amount of four ounces, but ceased within six hours. She did not on this occasion come into the hospital on account of the hæmorrhage, and accordingly left as soon as another ailment was cured.

As regards treatment, it would be superfluous for me to treat of it in this place.

SECT. V.—SIMPLE CONJUNCTIVITIS (ACUTE).

Simple inflammation of the conjunctiva is very common, and occurs with little or no increase of the mucous secretion. It is either general or confined to the lids, active or passive, acute or chronic.

Active Acute General Conjunctivitis.—This form of the disease is often very sudden in its access, and resembles the effects produced by the introduction of a foreign body between the lids; I have known this so much so, that the patient has named a certain spot where, on encountering a current of air, he has felt a sudden prick in the eye, followed by roughness, feeling of sand, pain, and lachrymation.

We rarely see the patient until the disease has existed several hours, when we find on examination that the conjunctiva of the lids and globe is red, its vessels distended, that the eye waters profusely, and that the lid is more or less spasmodically closed from an intolerance of light. The redness of the tunic usually commences on the lids, extending to the globe; is of a bright scarlet colour, and proceeds from the inflammatory injection of the superficially-placed conjunctival vessels and capillaries. In the early stage of the affection we can readily see the individual vessels, the aggregate of which impart the scarlet colour to the tunic; they form numerous anastomoses, con-

stituting a complete vascular network, and from the looseness of the conjunctiva, can be readily moved on the sclerótica, through the medium of the lids. From these causes the conjunctiva appears swollen, and its surface uneven, becoming more so at a later period, from effusion of serum. The flow of tears, which the patient describes as scalding, is sometimes profuse, especially when he endeavours to employ the eye, or it is exposed to the light by examination. This symptom increases with the increase of the disease, and diminishes and disappears as the symptoms generally are alleviated and cured. With this symptom also we find a certain degree of spasmodic action in the orbicularis palpebrarum associated, depending on the increased sensibility of the filaments of the fifth nerve, as I shall have especially to explain under the heads of strumous conjunctivitis. In severe cases these latter phenomena entirely prevent all employment of the affected eye.

We learn from the patient that he suffers pain and considerable annoyance from the disease, and that the light is offensive and painful to him. The pain is of a smarting and burning character, and is quite superficial, being unattended by any pain in the brow or head, whilst the other annoying sensations are very characteristic. At first they consist of a sense of stiffness and dryness, which gradually disappear, and on every motion of the lids or eye a most distressing feeling of dust or sand rolling between the globe and lids. The intolerance of light is rarely a very painful symptom, and is dependent on the same cause as the lachrymation and closure of the lids, viz., on an increased sensibility of the fifth nerve.

As the disease proceeds these symptoms increase in severity; the redness augments, and advances to the cornea, stopping abruptly around the cornea, whilst the individual vessels are less conspicuous, and give an almost uniform bright scarlet tint to the tunic, and the larger trunks, by their junctions and divisions on the lids, and over the globe of the eye, forming a complete reticulation. In some very acute cases slight ecchymoses are sometimes formed between these branches. The inflammation also extends to the subconjunctival cellular tissue, and leads to inflammatory œdema of that structure, by which the conjunctiva acquires a puffy appearance, and is slightly elevated around the cornea, being a slight form of the affection termed chemosis.*

Simple inflammation of the conjunctiva rarely extends to deeper seated tissues, or gives rise to any dangerous consequences. In certain constitutions, and from neglect, it may pass into a chronic state, and prove troublesome, but its usual duration, under favourable cir-

* It will be unnecessary to describe the subacute, subactive form of the disease, in which all the symptoms are essentially similar, but milder in character and slighter in degree. The symptoms are sometimes so trifling that the patient takes little or no notice of the affection, and merely says his eye is blood-shot.

cumstances and active treatment, is short, being from twelve hours to three or four days.*

The constitutional symptoms of this form of conjunctivitis consist of general excitement, and slight febrile derangement; the skin is apt to be hot, the pulse full and frequent, sometimes decidedly *hard*, the bowels are almost always confined, and the tongue is coated with a slimy fur.

The disease is almost invariably confined to *one eye*, whilst catarrhal ophthalmia, which some writers consider as synonymous, affects *both*.

The diagnosis of the disease is easy after a little experience. We may always know that the conjunctiva is inflamed by the *extent* of redness, by its spreading from the lids over the conjunctiva oculi to the margin of the cornea, by the scarlet colour of the redness, and the network formed by the vessels, whilst these vessels themselves are readily moved on the subjacent sclerotic. We know that it alone is involved by the absence of pain over the brow, or in the prominence of the malar bone, and by the simple presence of a sensation of sand between the lids, without any deep-seated pain in the eyeball, and by the appearance of the cornea and iris, &c. From the presence of a foreign body between the lids, it is known by the absence of pricking or roughness, especially affecting some one limited spot, or, if there be any doubt, by inverting the lid over a probe, and examining its internal surface, and the fold formed by its reflection from the lid to the globe.

In healthy individuals simple active acute conjunctivitis, when seen early, and treated actively, is not a dangerous disease, for under these circumstances there is little chance of the spread of disease to the cornea, and to deeper and more important tissues. Should, however, the health be very unfavourable, and the disease neglected, considerable trouble may be experienced, although the danger is not much of ultimate injury to vision.

The causes of the disease are similar to those usually concerned in the production of active acute inflammation. Vascular fulness of the system, luxurious living, and excessive employment of the organs predispose. In general the health is more or less deranged, the abdominal ganglionic system out of order, or the head congested, prior to the commencement of the conjunctivitis on the application of some exciting cause. Under these circumstances, agents, which would not have originated evil in a perfectly healthy state of the constitution, now excite the affection. The more frequent exciting causes are exposure to a current of cold, damp air, especially when there has been any sudden change in the meteoric condition of the atmosphere, mechanical injury, or sudden or continued irritation from any cause; and these are sometimes more or less overlooked or disguised by other symptoms; thus, inverted eyelashes, tumours of the lid, or the intrusion of foreign

* In some cases the vessels assume an atonic dilation after the active disease has passed off.

bodies, may not be mentioned by the patient, and, unless sought for by the practitioner, may be entirely overlooked. There was a patient in the West of England Eye Infirmary, who was admitted as an in-patient for very severe purulent ophthalmia, who had no suspicion of his disease depending on a mechanical cause. As he complained of severe pricking and pain in one particular spot at the reflection of the conjunctiva, from the upper lid to the globe, an examination was instituted, but from the swollen and vascular condition of parts nothing was discovered. About a week subsequently, as these same symptoms continued, and the disease augmented rather than decreased, a second and more careful examination was made, when, in the very situation of the patient's uneasiness, a long sharp beard of barley was discovered, covered by, and hidden in, a fold of tumefied membrane. On the removal of this foreign body the disease immediately assumed a favourable character, and the patient soon became quite well.

I recently attended a gentleman with a very acute form of this affection. He was of full habit, and plethoric. The account he gave me of its occurrence was, that on a Saturday afternoon, in passing through Covent Garden market, he suddenly felt a peculiar sensation in his right eye, which was previously quite well, that the eye remained uncomfortable during the evening, but that the next morning it pained him so much, watered so profusely, and closed so involuntarily, that he was quite unable to use it at all. I found him with a hot skin, full, frequent pulse, and constipation. By a liberal application of leeches, an active calomel purge, and a tepid acetate of lead collyrium, he was cured of all the active symptoms in a few hours.

A milder form of the affection is what I have termed *partial conjunctivitis*. It commences in the conjunctiva of the lids, and ceasing to spread, it is confined to that situation, with the exception of a few inflamed trunks which pass to the conjunctiva oculi. The lid appears slightly red, and swollen externally, and on inverting it the lining is found of a scarlet colour, and loaded with reticulated prominent vessels.

Passive Acute Simple Conjunctivitis.—This variety of inflammation is frequently met with, although much less frequently than the preceding forms. It occurs in leucophlegmatic habits, in debilitated individuals, or in states of the constitution where the health is much deranged. It is less sudden in its approach, progresses more slowly, and lasts a longer period.

The disease, as in the active type, spreads from the lids to the cornea, and presents a similar distension of vessels, but contrasted, the local phenomena differ greatly. The colour of the inflamed membrane, instead of being of a bright scarlet, is of a dark or purplish hue, and instead of giving the idea of increased activity of arterial and capillary circulation, it looks as if the blood stagnated in the relaxed and dilated vessels, and acquired a change to venous before it reached venous canals. The affected vessels are more tortuous, larger, and less nume-

rous. The conjunctiva itself has an œdematous, relaxed, and sodden appearance, whilst there is but little increase in the lachrymal secretion, and little if any spasm in the orbicularis.

The patient complains of smarting and uneasiness in the superficial parts of the eye, and of roughness on moving it, but slightly of intolerance of light, whilst the sensation of sand is much less distinct than in the active form.

As the disease proceeds, it frequently causes much œdematous swelling of the lids, and sometimes extends to the cornea, where it is apt to occasion atonic ulcerations very difficult to heal, unless their true nature be understood. All the symptoms are usually aggravated by the horizontal position—a fact which should be borne in mind in all the inflammatory diseases of the eye.

The constitutional symptoms are those of derangement and depression, without inflammatory fever. Generally gastro-enteric disturbance, with pale, flabby tongue, and depression of spirits; the pulse feeble and soft, or full, and readily compressible; the feet are usually cold, and sometimes the general surface, denoting languor of circulation and diminished nervous energy.

The prognosis is favourable where the case is understood and properly treated; but if depleting measures only are had recourse to, its duration is very prolonged, and severe mischief may be done to the cornea before these injurious measures are remitted.

The predisposing causes are constitutional derangements in individuals whose vital powers are either for the time, or naturally, below par, especially if they have previously suffered from conjunctivitis. The exciting are similar to those usually engaged in the production of the active form; but the most common certainly are atmospheric vicissitudes, excessive employment, and exposure to partial currents of cold damp air. Many cases of the disease have originally been active, but by excessive depletions, anxiety of mind, and medicine, have degenerated in type, and finally require a complete change of regimen and medical measures.

Passive acute simple conjunctivitis sometimes comes on in individuals whose constitutional powers have been greatly depressed by adverse circumstances or disease, and presents intense scarlet vascularity, great rapidity of progress, and but little pain. In these cases the cornea is almost always simultaneously attacked with rapid ulceration, or even sloughing, as I shall describe more at large under the head of "ulceration of the cornea." Similar phenomena are observed when the fifth nerve has been divided in the cranium. (Vide Ulceration of the Cornea.)

Treatment.—I will, in the first place, discuss the appropriate plan of treating the active acute form, and secondly, the passive acute type of conjunctivitis.

In that form which is confined to the lids simple measures are alone necessary. The patient should be careful in his diet, and keep him-

self from damp and cold situations. On first seeing him, it is advisable to order an active purgative—five grains of calomel, followed in two or three hours by a full dose of jalap, or the two remedies may be combined; at the same time, he should bathe the lids freely, five or six times a day, with a weak tepid solution of the acetate of lead (ten grains to one scruple of the acetate to half a pint of distilled or rose-water), and allow a small quantity of the collyrium to flow between the eyelids.

In the more active and general form, prompt and decided measures are necessary. If the pulse be full and incompressible, decidedly hard, the skin hot, the patient plethoric and vigorous, I believe it is best to place him in the erect posture, and bleed him to incipient syncope from a full-sized aperture in the arm. Under these circumstances, we are enabled to inspect the effects of general blood-letting on a local inflammation: the vessels, previously full and injected, become empty and apparently passive; the bright scarlet colour changes to a pale or whitish-pink; the irritability of the eye and the flow of tears is relieved; and the patient no longer complains of pain or intolerance of light. As reaction finally succeeds, the primary symptoms return in a greater or less extent, in proportion to the benefit wrought. In less active and urgent cases, cupping from the nucha, or the application of leeches around the eye, proportioned to the age, constitution, and strength of the patient, and the activity of the disease, will be sufficient. It may sometimes be necessary to follow up the venesection, in severe examples, by one or more applications of leeches, but such a necessity is rare. Bleeding from the temporal artery is quite unnecessary, and from the subsequent necessity of using tight bandages and compresses, and the fear of an aneurismal formation, it is injurious and culpable.

The effect of an active purge is always most salutary in this disease, as far as I have observed. It should be administered as soon as the patient is seen, and repeated if its effects are not sufficiently great after some hours. The remedies selected should act on the gastrointestinal and biliary secretions, as well as thoroughly clear out the alimentary contents. For this purpose a full dose of calomel with ipecacuanha or antimony should be administered, and its action promoted a few hours afterwards, or the next morning, by an active purge of jalap, either alone or in the following combination:—Powdered jalap, senna, and bitartrate of potassa, equal parts. The dose for an adult consists of two scruples, and is termed *pulvis purgans* at the West of England Eye Infirmary.

As regards local applications, warm or tepid fomentations, or collyria, are in general more agreeable to the feelings of the patient than cold ones. Weak solutions of the acetate of lead, ten to twenty grains of the acetate to half a pint of distilled water, I generally prefer; it gives much relief to the patient, and lessens the vascular disturbance.

Poppy fomentation is also a valuable application, although these remedies are of minor importance.

Blisters are rarely necessary in the active acute disease, but should the more acute symptoms be subdued, and the disease seem inclined to pass into a chronic stage, a blister behind the ear may be very valuable.

An important point to be attended to in all forms is the removal of any exciting cause, should one exist; such, for instance, as an inverted eyelash, a foreign body between the lids, &c., the diagnosis of which I have already mentioned. In some cases, accumulated fecal matters, or obstinate hepatic, uterine, or gastro-enteric disturbance, may require especial attention, without which the local disease will not subside; but the ordinary symptoms of these affections must be consulted, and an appropriate plan of treatment instituted.

In all cases an appropriate regimen should be adopted, the head kept sufficiently elevated, and a broad, deep, green shade, worn over the affected eye. Anything which keeps the head or eye hot and confined, as bandages, small close shades, &c., should be studiously avoided.

Treatment of Passive Acute Conjunctivitis.—As broad a difference is requisite in the treatment of these two affections as exists in their symptoms. Blood-letting is unnecessary and injurious, whilst a local astringent and general tonic plan of treatment is indicated. On first seeing a patient, a blister may be directed, in general with advantage, behind the ear corresponding to the affected eye; a full dose of calomel with a grain of quinine administered, to be followed by an ounce of castor-oil, or equal parts of rhubarb and sulphate of potass (ten to fifteen grains,) with a few grains of ginger. As a local application to the lids and conjunctiva, I have found no remedy so efficacious as a weak solution of alum in distilled water.

In most instances, especially if ulceration of the cornea be present, the most remarkable benefit results from very lightly pencilling the *outside* of the eyelids with a stick of the nitrate of silver, passed over them once or twice with a light hand, or with a solution of the nitrate in distilled water. This practice is especially advantageous in strumous conjunctivitis, and for that section I shall reserve a fuller description of the best mode of its employment and indications.

Our general treatment must be nutritious and tonic; the diet carefully regulated, but containing a due proportion of animal food, whilst the exact condition of the health must regulate the administration of remedies. In some instances moderately full diet, with malt liquors, is amply sufficient to fulfil these indications; in other instances, quinine, with taraxacum, Plummer's pill, &c., may be necessary; and where the strength is greatly reduced, small doses of sulphate of zinc; finally, if there be a decided state of anæmia or deficiency of rich blood, iron, either the ammonio-citrate or tartrate, &c.

I may state, that these measures are to be employed in a modified degree in those cases where active general and local symptoms have subsided, and the inflamed vessels remain distended, as if from loss of tone—either an astringed collyrium, or a single application of the nitrate of silver to the external skin of the eyelids.

SECT. VI.—CHRONIC SIMPLE CONJUNCTIVITIS.

Active Type.—In this section it is not my intention to describe the chronic forms of disease which may result from the gradual subsidence of the acute varieties of conjunctivitis, but to confine myself to those which are from their commencement similar in character.

This form of conjunctivitis is mainly confined to the adult, and presents a much less degree of vascularity than the acute disease. The eye presents a red, vascular, or blood-shot appearance, which is found to depend, on a close inspection, on a number of large, tortuous, dilated conjunctival vessels, which as they approach the cornea, terminate in a lash of smaller ramifications, ending abruptly at the cornea, when that tunic is unaffected. Their colour is a dull red, approaching to brick-dust, and much less vivid than in the acute variety. The eyes water on the least excitement, and the vascularity varies in amount at various parts of the day, and from changes of weather, diet, &c. The lids also are similarly affected.

The patient complains of uneasiness, stiffness, “sticking,” and sensation of sand in the eye. In most instances the light is offensive, and the symptoms are increased by exposure. The enlarged trunks impart a very distressing feeling of roughness or sand between the lids when the eyes are moved. The disease may exist for a very considerable length of time; and if the predisposing and exciting causes be not removed, it increases in severity, and is apt to extend to the conjunctival covering of the cornea, which is rendered vascular and nebulous, and sometimes originates irregular ulcerations.

The disease affects both eyes, and the idiopathic forms are, I believe, invariably dependent on constitutional causes. I have seen several cases which evidently depended on excessive snuff-taking, full habits, and a tendency to cerebral congestion. In many instances it accompanies or follows other diseases of the eye, as iritis, choroiditis, and retinitis, and in such instances I have generally made it a distinct item of treatment, partly to amuse the patient, and partly from the benefit really derived by so doing. The chronic conjunctivitis arising from granular lids, inverted eyelashes, entropium, &c., I shall have to speak of separately.

The constitutional symptoms are generally connected with the vascular, digestive, and excreting functions. The blood seems to be inordinately rich in some patients, and more or less contaminated; the pulse is full, and harder than natural; the skin acts imperfectly, or partially; the majority of the secretions may be deranged; and in most

patients we find the tongue foul, the bowels confined, and the stomach or liver out of order. These states of health precede the local disease, and predispose or excite its invasion, and hence are not sympathetic of the inflammation.

The predisposing causes, then, are the states of health I have mentioned, without which I do not remember seeing any patient affected with the disease. The exciting causes are an excess in snuff, excessive employment of the eyes in reading, mechanical occupations requiring careful attention, especially if carried on by artificial light. I attended a gentleman with this disease, who was much out of health, who attributed the ophthalmic affection to constant exposure to dust in his superintendence of some extensive mills. It is also excited by other diseases of the eye. A very obstinate case was under my care in the spring, summer, and autumn of 1842, which came on in this way: It followed, in this case, a severe attack of syphilitic iritis; the iritis was perfectly cured, but the health suffered from depletion, mercury, and some remaining symptoms of syphilis. The conjunctivitis finally yielded, most satisfactorily, on the improvement of the health.

Under the head of *diagnosis* I would state, that in all cases the lids should be examined, in order to determine whether they are or are not granular, and that a careful inspection should be instituted, by holding the lid some little distance from the eye, in order to detect any misplaced eyelashes, which are sometimes extremely fine and light-coloured, and not readily seen.

A *partial* form of this disease, confined to the palpebral conjunctiva, is known by the name of psorophthalmia. The lid is red, and the conjunctiva traversed by several fine scarlet vessels. The patient complains of much irritation, pricking, and itching of the lining membrane of the lids, and occasionally of adhesion of the eyelids in the morning, on first awaking, from a glutinous mucous secretion during the night. The eyes are, to use the patient's expression, "weak," so that he is unable to employ them as before. It affects both eyes, and is apt to endure for several months. Many of these patients overwork their eyes on small objects, such as females in needlework, &c., and hence the exciting cause remains, whilst the general health is mostly affected. The disease is dissimilar to, and has no connection with, tinea and lippitudo, as I shall hereafter explain.

Passive Chronic Simple Conjunctivitis affects pale and cachectic subjects, whose general health is not only deranged, but whose vital powers are depressed. The lids, in these examples, are pale externally, smooth, and shining, becoming especially so from any increased irritation. The conjunctiva presents a glossy, relaxed appearance, and is traversed by a number of vessels, more numerous, and the majority smaller, than in the active form; they are of a pale leaden colour, and seem to change their contained blood very slowly and imperfectly. A layer of watery mucus covers the conjunctiva, which is apt to dry in the night, and cause the lids to adhere in the morning. I have seen

this condition combined with ulcers of the palpebral conjunctiva almost as frequently as alone. We learn from the patient that his eyes do not pain him much, but that they occasion him constant annoyance; that the affection renders his powers of vision very defective, and that he has generally to soak the eyelashes with warm water before he can open them of a morning.

The disease attacks both eyes, and remains, with various remissions, relapses, and improvements, for several months, under the ordinary plans of treatment.

The constitutional symptoms precede the local ophthalmia, and consist usually of general debility, sallowness and pallor, deficiency of tone in the soft parts, a feeble soft pulse, indigestion, imperfect action of the liver, and constipation. The tongue is pale, moist, flabby, and marked by the teeth, the skin pale and chilly, the perspiration abundant and cold; whilst the patient may or may not complain of giddiness, or other head-symptoms. In some cases all these symptoms are present, whilst in others some, or nearly all, may be absent.

Treatment.—In these various forms the indications for treatment are twofold: to cure the local affection, and secondly, to improve the constitutional health.

In the *active* disease, where the system seems inordinately full, and the head suffers from congestion, cupping from the back of the neck, repeated according to circumstances, is highly beneficial. In ordinary cases, however, this is unnecessary, and the best mode of cure is to blacken slightly the outside of the lids with the nitrate of silver, at intervals of from four days to a week. Should the lids adhere in the morning, it is well to employ a small portion of the unguentum hydrargyri nitrico-oxydi, about the size of a pin's head, liquefied by holding it near the candle, every night on going to bed, anointing the edges of the lids with the ointment. If the nitrate of silver be not employed, it is best treated locally by moderately strong solutions of the acetate of lead (three or four grains to the ounce of rose-water) or alum, alternated with a collyrium formed of equal parts of wine of opium and water, and in obstinate cases by the application of one or more blisters to the back of the neck, or behind the ears.

The constitutional treatment which I have seen and found most efficacious, is moderate and continued purgation by the compound colocynth pill, with or without one-eighth of a grain of the potassio-tartrate of antimony, a steady use of the compound calomel pill, five grains every night, and an occasional warm-bath, followed by brisk friction of the skin. The diet must be moderate in quantity, carefully selected, and well masticated, and the patient should take daily exercise, to the avoidance of fatigue. In the female, it is necessary to pay attention to the state of the uterus, and in all cases to treat any particular disturbance which may exist in any organ.

In *passive* cases, the lotions I have previously mentioned are beneficial, when frequently applied to the conjunctiva and lids, and the red

ointment (nit. oxyd.) should be also employed at night. The external application of the nitrate of silver in substance is apt to produce much œdema of the lids, especially in thin-skinned, delicate persons. It is best, therefore, to paint the skin of the eyelids over once with a solution of about six grains to the ounce of water, by means of a camel's-hair brush. In a passive case, occurring in a large leucophlegmatic man, whom I treated by applying the nitrate in substance to the outside of the eyelids, it produced very severe effects. The cuticle came off in white flakes, the lids swelled to a great extent, so that he could not open his eyes for about thirty-six hours, and it occasioned him very considerable pain. In about three days, however, all these symptoms passed off, and proved also a perfect cure to the original affection.

These cases almost always demand the use of tonics and nutritious diet. Five grains of the aloes and myrrh pill, with a grain of quinine or sulphate of zinc every night, as a tonic purge, and some mild bitter with the mineral acids, two or three times a-day, with or without the compound tincture of cardamoms. Sponging the surface freely with tepid water every day, or every other day, and exciting the skin by means of a coarse towel or the flesh-brush, is in many cases highly beneficial. If the secretion of the liver be much deranged or deficient, the soft extract of taraxacum, in doses of a tea-spoonful, two or three times a-day, is sometimes successful, and in these cases the inspissated ox-bile, in doses of five grains three times a-day, deserves a careful trial.

SECT. VII.—IRRITABLE CONJUNCTIVITIS.

Definition.—An inflammation of the conjunctiva, dependent on a debilitated and morbidly susceptible state of the constitution, marked by local irritability, and a general tendency to hectic fever.

Irritable conjunctivitis, in this sense, embraces a class of inflammatory affections, which differ from the passive types of chronic simple conjunctivitis mainly, by presenting locally less the symptoms of inflammation than nervous irritation, and generally a tendency to hectic fever, rather than mere cachexia and constitutional feebleness. The disease is most commonly met with in the female, from undue lactation, and derives its chief importance as an indication of the state of system from which it derives its origin, and of the immediate danger which exists of the supervention of amaurosis, or more rarely of a destructive form of corneitis. Both irritable conjunctivitis and amaurosis occur most frequently from *protracted* lactation,—women, among the lower classes of society, as Mr. Middlemore (to whom the profession is indebted for first calling attention to the subject) justly remarks,* believing that whilst they continue suckling they cannot be-

* Treatise, vol. i. p. 298.

come pregnant, often continue to nurse their infants for a very long period; but, on the other hand, they may come on from *undue* lactation, a few months after its commencement, if the powers of the patient, from any cause, be unable to bear the tax on the system.

Irritable conjunctivitis of suckling women.—Among the lower orders of society I have seen several cases of this disease; and, judging from my own experience, I should say that it is comparatively common among the suckling females of this class.

Symptoms.—The affection comes on gradually, and is marked at first by slight vascularity, especially of the conjunctival lining of the lids, a secretion of gummy mucus, which is apt to glue the lids together after sleeping, a sensation of roughness when the eye or lids are moved, and much local irritability, so that pain, lachrymation, and frequent quiverings, or slight spasm of the orbicular muscles, are induced, from exposure to light, or the slightest exertion of the organ.

When the disease is fully formed, we find, on examination, that the inside of the lids is of a scarlet colour, owing to the presence of several vessels of comparatively large size, which form a reticulation by their anastomoses, whilst several irritable-looking trunks run towards the cornea in the sclerotic conjunctiva, and terminate in a lash of finer vessels. The tarsal margins also are often red and inflamed, especially, according to Mr. Middlemore, towards each canthus, and the lachrymal caruncle enlarged, of a florid colour, and pouring out a glutinous discharge. A small quantity of gummy mucus collects on the margins of the eyelids, and in the inner canthus; whilst we often find exposure to light distressing, and attended with lachrymation, and spasm of the orbicularis. In some instances the lids are so irritable as to be constantly quivering, as Mr. Middlemore remarks, as though the orbicular muscle were undetermined in its action, and rapidly, though only partially, contracting and relaxing in frequent succession. A constant condition of epiphora attends this state of irritability.

The patient complains of a most unpleasant sensation of roughness, as of sand, when the organ is moved; great irritability on attempting to use it, or from exposure to bright light, either solar or artificial; and not unfrequently of some slight, but permanent, imperfection of vision. There is likewise much smarting and itching, with stiffness of the lids, which are often slightly œdematous, and adhere together after being long closed.

Constitutional symptoms.—The ophthalmia is preceded and accompanied by general debility and nervous irritation. The patient finds herself quite unable to perform her usual duties, from a sense of sinking and muscular weakness; her breath is short, and the heart palpitates from the slightest exertion. The pulse soon becomes habitually weak and quick, the cheeks reddened with a circumscribed flush, the nervous system very excitable, and the skin prone to perspire freely. Towards evening a slight febrile paroxysm is generally experienced,

—a transient chill, followed by heat, and finally by perspiration, which, in unfavourable and severe cases, is apt to be profuse.

There can be no doubt that the conjunctivitis depends on this state of system, and that the inflammation should be regarded as a salutary warning of the danger of persisting in that tax on the system which has occasioned the general and local disease, and, if persisted in, will assuredly induce a much severer local affection,—either amaurosis or corneitis, with more decided and confirmed hectic fever.

Irritable conjunctivitis almost invariably attacks both eyes, although Mr. Middlemore, in the *Prov. Med. and Surg. Trans.* mentions three curious cases, where the disease was confined to one; these patients having suckled from one breast, and the affected organ corresponded to this side.

Prognosis.—If the disease be seen before any other mischief has accrued, even though the vision be slightly obscured, the prognosis is most favourable, provided that the exciting cause be removed, and the system supported and rested. On the contrary, if it be neglected, or the patient obstinately continues to suckle her child, our opinion must be unfavourable. In the first instance it will prove but a precursor to more serious evil; in the latter, tonics and nutritious diet are by no means sure of effecting good, whilst the exciting cause remains; it is like bleeding and purging to subdue an inflammation, which is kept up by the intrusion of a foreign body.

Treatment.—The first indication for treatment is to remove the child from its mother's breast; the second, to support the system by tonics and nutritious diet; and the third, to subdue the existing conjunctivitis by suitable local means.

Tonics must be selected according to circumstances; in general the salts of iron or zinc are most beneficial; but, if at first too powerful, we may commence with the vegetable bitters, in combination with the mineral acids, followed by quinine. At the same time mild tonic aperients should be occasionally used, and the skin sponged with cold or tepid water, to be followed by brisk friction. The diet also should be selected according to the powers of the digestive organs, but should consist of a due allowance of animal food, with or without malt liquors or wine.

If the affection be severe, the nitrate of silver may be applied at intervals to the outside of the lids, and a little of the ung. hydrarg. nit. oxyd. dissolved by heat, be smeared along the edges of the lids at night. In less severe cases the ointment alone may be necessary, applied night and morning, or the lower lid may be drawn down, and some diluted vinum opii, or the dissolved ointment, be applied, by means of a camel's hair brush, to its conjunctival surface.

Erysipelatous Conjunctivitis is an atonic form of the inflammation which occurs in persons somewhat advanced in life; but it may also involve the conjunctiva when erysipelas attacks the lids.

The inflamed membrane under these circumstances presents a yellowish red colour, and is much paler than in the active acute forms. The disease is also characterised by serous effusion underneath the membrane, which elevates it into a somewhat transparent form of chemosis around the cornea, and often forms a number of small yellowish vesicles, or bullæ.

The patient complains of a pricking, burning, or smarting sensation, with some intolerance of light, and lachrymation, but without much of the distressing sensation of sand in the eye, so generally experienced in conjunctival inflammation. A slight secretion of mucus attends the affection, and, drying on the lids, often glues these together during sleep.

The attack is preceded and accompanied by derangement of the general health, by a furred tongue, foul breath, and hepatic disorder, usually attended by lassitude, and feverish disturbance.

Treatment.—It is best to commence treatment by the exhibition of one or more mild alterative purges, and to attend to the state of the bowels carefully during the attack. Tonics, also, are generally indicated during and shortly after the continuance of the disease. Locally the nitrate of silver is to be applied very lightly and carefully to the outside of the eyelids, at intervals, and the red ointment (ung. hyd. nit. oxyd.) dissolved by heat, should be used every night, smeared along the tarsal margins.

SECT. VIII.—CATARRHAL CONJUNCTIVITIS.

Synonyms.—Conjunctivitis catarrhalis, mucosa, vel atmospherica.

Catarrhal conjunctivitis, or ophthalmia, is a comparatively mild inflammation of the eye, which is principally seen in the spring, and more commonly affects children, especially those of strumous constitution, or of that delicate habit which so powerfully predisposes to this cachexia.

Definition.—A peculiar inflammation of the conjunctiva, attended by an increase of the natural mucous secretion, identical with, and dependent on, the same causes as catarrhal inflammation of the Schneiderian membrane, or coryza.

The affection commences with some trifling redness of the lids and eye, with an increased flow of tears, and is not uncommonly combined with the ordinary symptoms of coryza, which the patient denominates as a cold in the head and eyes. These symptoms augment, and the tunic gradually acquires a bright scarlet colour, from the spread of vascularity towards the cornea. In all respects the nature and appearance of the redness, and the character and arrangement of the blood-vessels, are similar to what I have already described in simple conjunctivitis. As these changes proceed, the membrane becomes bathed in a watery grey mucous secretion, which is sometimes so abundant as to flow over the cheek, and, by collecting in front of

the cornea, dims the patient's vision. As soon as a decided mucous flux is established the appearance of the inflamed membrane alters; it becomes much more relaxed, and conveys to the mind of the observer an impression that the previously existing tension has been relieved by the discharge. In fact, the conjunctiva acquires a soft, relaxed, and moist appearance, which shows that a material change has been effected in the nature of its disease. The lids are usually more swollen in this than in the simple form of conjunctivitis, and the sub-conjunctival oedema is more considerable, though a symptom of minor import.

The subjective symptoms are at first exactly similar to those of the simple disease, viz., stiffness and smarting of the lids and superficial parts of the eye, followed by roughness, as of sand between the eye and lids, and a burning sensation. These symptoms diminish as the relaxation of the membrane I have described comes on, and the patient scarcely, if at all, complains of any pain from, or intolerance of light; hence, also, there is no spasm in the orbicular muscle, nor much flow of the lachrymal secretion.

As the affection proceeds the redness assumes a more uniform character, and the mucous secretion augments till about the third or fourth day, when, under favourable circumstances, the inflammation diminishes, and the mucous assumes a yellower appearance and a thicker consistence. At this stage it collects about the eyelashes, and is apt to glue the patient's lids together during sleep. Finally, in strictly healthy subjects, and in the pure form of this disease, it now speedily subsides, without leaving any trace of its previous existence. Sometimes, however, the disease loses its specific character, and degenerates into a chronic form of muco-purulent ophthalmia, or, in strumous subjects, assumes the shape of tinea, or some other affection of the eyelid. In these constitutions, also, the affection is sometimes attended by one or more pustules around the cornea, which are yellowish in colour and unattended by intolerance of light, as I shall more fully describe under the head of pustular conjunctivitis.

The constitutional symptoms are similar to those which occur in that slight febrile disturbance of the system ordinarily termed "cold;" there is heaviness and lassitude, slight nausea, and a tendency to chilliness. Where other mucous membranes are simultaneously affected these symptoms are more severe, and accompanied by heaviness and dull pain in the head, and generally some imperfection in the senses of smelling and hearing. Both the local and general affections suffer an increase towards night and a remission in the morning.

Passive form.—This variety of the disease occurs in delicate leuco-phlegmatic persons, and differs mainly from the active type in the absence of all pain, uneasiness, or intolerance of light, whilst the secretion of mucous is more profuse and watery.

Contagiousness.—This disease not uncommonly passes through all

the children of a family or school, the various members seeming to be infected by intercourse with those who suffer primarily. At other times it is not confined to particular houses, but assumes an epidemic character. We see these facts so frequently illustrated in simple catarrh, independent of the conjunctival disease, that they seem to be its general laws. Whether or not the discharge of catarrhal conjunctivitis, strictly so called, be contagious, any more than the discharge from the Schneiderian membrane, is open to dispute. My own belief is, that whilst the disease retains its specific character, and the secretion is *mucus*, not *pus*, it is not capable, *per se*, of originating a similar disease. Experiments assuredly are wanting; but as the disease is certainly propagated by intercourse, it is best to act as if its contagious nature were certain. Affected individuals should be separated from the healthy, and carefully abstain from using the same sponges, towels, &c. No doubt can be entertained of the contagious nature of purulent ophthalmia.

Catarrhal conjunctivitis usually affects both eyes, whilst the simple disease is generally confined to one. The uncomplicated form is a specific affection, invariably depending on atmospheric causes; it has a short duration, has a definite course, and is free from danger. The local activity and tension of the inflamed membrane are relieved by the discharge, a fact which imparts a peculiarity to the process, and to all similar processes in mucous membranes, rendering astringents beneficial, and, in some cases, even powerful stimulants which would have been highly injurious in simple conjunctivitis unattended by a relaxing secretion.

The predisposing causes are susceptibility and delicacy of constitution, especially a tendency to struma, long confinement to bed or a warm room, and the previous occurrence of the disease. The exciting causes are peculiar states of the atmosphere; sudden changes from cold to warm or warm to cold; dampness with cold, especially if the patient be suddenly exposed; wet feet; exposure to a partial current of air when long-continued, but chiefly when the season of the year and the atmospheric conditions are also concerned. These causes are more felt, when occurring in climates where the differences between the day and night are great.

The diagnosis is easy, the remarks previously made on simple conjunctivitis applying here as regards the diagnosis of the affected membrane, whilst the mild character of the disease, the secretion of *simple mucus*, the absence of pain, and its general catarrhal features, can leave no doubt of the disease.

Conjunctivo-scleritis is a disease of advanced life; is attended by a dull aching pain in the globe; severe pain over the brow, invariably aggravated at night; and by a zone of small straight vessels around the cornea, although this last symptom may be masked by the conjunctival vascularity.

From what has already been said, it may be gathered that the

prognosis is always favourable. In healthy subjects, aided by slight care, the disease will pass off spontaneously, in a few days, and the severest cases invariably do well under judicious treatment.

A *partial* form of this inflammation exists, where the diseased actions are confined to the mucous membrane of the eyelids; and this, in scrofulous children, is apt to be followed by some of the strumous diseases of the lids. In other cases the disease is extremely mild.

Treatment.—The milder forms of catarrhal conjunctivitis require nothing further than care for a few days, and the application of warm water to the eyes. In the severer examples, it is frequently necessary to have recourse to constitutional and local treatment. Blood-letting, either general or local, is unnecessary, and therefore improper. A tolerably active purge is highly beneficial, and should consist, as I mentioned under the head of simple conjunctivitis, of a mercurial and an antimonial, followed by jalap, castor oil, or senna, &c. This is all the constitutional treatment necessary in ordinary cases, but if the conjunctivitis be combined with common catarrh or coryza, or the epidemic influenza, antimonials with ipecacuanha and nitrate of potass, prove valuable remedies.

Highly powerful local remedies are not adapted to the simple condition of catarrhal conjunctivitis, where the secretion is only mucus; but the pathological condition of the membrane not only bears, but is benefitted by astringents. The best of these are the acetate of lead and alum, dissolved in distilled water, containing from three to five grains to the fluid ounce, and used slightly warm. The lids should be frequently bathed, and three or four times a day some of the collyrium may be injected with gentle force between the lids by means of a glass syringe, or applied to the conjunctiva by drawing down the lower lid. A very valuable and effective mode of treating these cases, especially when the symptoms are tolerably active, is by moistening the eyelids, and applying the nitrate of silver to their external surface. I may illustrate these propositions, and show the power of the remedy in cutting short the usual course of catarrhal conjunctivitis, by the following cases:—

One Sunday morning in April 1843, I was summoned to attend two cases of catarrhal ophthalmia, both of them in their incipient stages. The first case occurred in a stout healthy boy of about one year and a half old, in whom the affection had been noticed in a very slight degree on the previous evening. The affected eye (the right) seemed to pain him; and, if not prevented, he was constantly endeavouring to rub the organ. He could not bear the light, and the eye watered much when exposed. The conjunctiva was of a bright scarlet colour, and a quantity of greyish mucus had collected on the eyelashes and in the angles. The second was in a very healthy infant of about five months of age, in whom all the preceding symptoms were strongly marked. They were both treated in the same way, viz.:—the

integument of the lids was moistened with some lint moderately saturated in pure water, and a stick of the nitrate of silver was drawn quickly and lightly along the centre of each. The immediate effects were those only of slight itching, the little patients striving with all their powers to get their hands loose to rub the lids, which was, of course, carefully guarded against. In both cases every urgent symptom disappeared entirely in *the course of a few hours*, and the next day redness alone remained without pain, secretion of mucus, or intolerance of light, and which gradually passed off in a day or two. A dose of the hydrarg. cum creta, followed by an active aperient, was given to the elder patient shortly after the use of the nitrate.

Shortly afterwards I attended a passive case of this form of conjunctivitis. A little boy two years and a half old, of a lymphatic temperament, pale and feeble, was brought to my house with a slight attack of pustular conjunctivitis. This had nearly disappeared under the employment of a weak warm solution of the acetate of lead when he was exposed for some time to a current of cold damp air. I saw him the next morning, and found the eye intensely red, the conjunctiva of the lids and globe relaxed and oedematous, with a discharge of thin watery mucus; but there was no pain nor even inconvenience, no intolerance of light nor discharge of tears. In this case, also, I moistened the lids and applied the nitrate of silver externally; but in this, contrary to its effects in the former cases, it seemed to produce neither good nor evil results. The next day the skin was blackened where the remedy had been applied, but in all other respects the features of the disease remained exactly as they were before. Under the use of tonics and aperients, with a weak solution of alum locally, and the diluted ointment of the red oxyde of mercury, to prevent adhesion to the lids, this attack completely subsided in ten days. Change of air was then recommended, and the continuance of the ammonio-citrate of iron (which he had been taking during the latter stages of the disease) by which the general health was much improved.

In unhealthy subjects, if the local inflammation seem to lose its specific character, and settle down into a chronic muco-purulent disease, the nitrate of silver should be painted over the integuments of the lid, and a blister opened behind the ears. In the advanced stage of the affection, where the lids adhere in the morning, it is best to smear a little pure olive oil, lard, or simple cerate, along the tarsal margins at night. Weak solutions of the nitrate of silver require more care in their use, are apt to stain the skin or the patient's garments, and, as far as I have observed, are not so efficacious as pure astringents.

The diet should be sparing during the early stages, and the patient should dress warmly, avoid damp and cold situations, and by no means stand in wet places, or in currents of air. It is not, however, necessary to confine the patient to the house, unless the weather be very unfavourable. Indeed, as Mr. Lawrence states, free exposure

to a mild atmosphere is advantageous, so that the patient be properly protected. (Treatise on Diseases of the Eye, Edit. 2nd, p. 213.)

SECT. IX.—PURULENT CONJUNCTIVITIS, OR OPHTHALMIA.

Synonyms.—Egyptian, or contagious ophthalmia, ophthalmia neonatorum, gonorrhœal ophthalmia.

Definition.—Various degrees of inflammation of the conjunctiva at different periods of life, dependent on common or specific causes, and marked specifically by the secretion of pus.

The different affections included under the present head, although essentially similar in their pathology, (a difference exists in the state of the lining membrane of the lids,) present, nevertheless, sufficient difference in minutiae to entitle them to a separate consideration. I shall discuss the phenomena of the disease as it occurs in the *adult*; secondly, the purulent conjunctivitis of *infants*; and thirdly, the specific or *gonorrhœal* variety.

The purulent inflammation of the conjunctiva is a much more violent disease than any yet considered, even in its mildest forms, in which the discharge is muco-purulent. The catarrhal affection seems to form, indeed, a connecting link between the simple and the purulent inflammations; but it is in all respects dissimilar, as long as it retains its proper features; for whilst the first subsides in a few days without manifesting any tendency to involve the more important textures of the globe, the last may continue for an indefinite period; and one of their constant and most dangerous dispositions is, to spread to the cornea and deeper-seated parts, and to involve them in processes but too frequently fatal to the integrity and beauty of the organ. The truth is, that the inflammation is much more intense, and is not kept in abeyance by the specific character of the general state, of which the conjunctivitis is but a local manifestation.

1st.—*Purulent Conjunctivitis of the Adult. (From Childhood to Old Age.)*

This disease, like those I have already described, affects either the entire conjunctiva, or is confined to the lids, being, in its least severe form, a comparatively slight disease (that is, it is always severe, but slight in comparison with the worst varieties), with every gradation to the most violent, rapid, and destructive inflammation. In describing it I shall first sketch the disease as I have frequently seen it myself, and then the Egyptian malady as described by Vetch, Macgregor, and other writers.

The inflammation commences, like other forms of conjunctivitis, in the conjunctiva of the lids, and spreads, after a premonitory stage of from twelve to twenty-four hours, to the conjunctiva oculi. The lids present at first a net-work of bright scarlet vessels on their conjunctival surface, which, as it passes on towards the cornea, soon induces vast swelling of the conjunctiva itself, of the sub-conjunctival

cellular tissue, and of the reticular tissue of the lids. In this more advanced stage the membrane presents an almost uniform scarlet colour, all the vessels being distended to their utmost, with mottled portions of ecchymosis in many of the more severe cases. It is in the purulent inflammations of the conjunctiva that we see *chemosis* in its most marked and severe types. Serum and lymph are abundantly effused into the whole of the sub-conjunctival cellular tissue, especially around the cornea, by which the membrane is elevated, and thrown into folds. A circular fold is formed immediately around the cornea, which overlaps and partially hides this structure, and in some of the severer forms of purulent ophthalmia even projects between the lids, and nearly hides the cornea altogether. Occasionally hæmorrhage takes place from the conjunctiva during its condition of violent inflammatory orgasm, and partially relieves the over-distended vessels. The inflammation of the conjunctiva of the lids very speedily involves the neighbouring tissues, and only continues for a few hours as a simple inflammation. An increased and altered secretion is soon set up, which speedily assumes a yellowish appearance, and all the characters of pus. This alteration in the inflammation also extends to the conjunctiva oculi, occasioning an abundant outpouring of pus, which accumulates between the lids, as long as these remain closed, and then pours over the cheek, or is even thrown out with some violence, when the lids are separated. Notwithstanding the relief to the inflamed vessels and membrane afforded by this abundant secretion, the affection remains as a most active and violent disease, whilst at the same time its characters are so far changed that the most powerful local astringents, stimulants, and even escharotics, are not only borne without injury, but prove highly valuable, by modifying the progress and form of the diseased actions.

Under these circumstances the conjunctiva presents a thickened but soft villous or granular appearance, and after the disease has continued some time, the lining of the lids is often covered by small but irregular projections, resembling in appearance the granulations of an ulcer. From the cellular tissue of the lids, the inflammation spreads to the integuments, which become of a bright red colour, and of a smooth and shining aspect, being enormously swelled, especially the upper ones, and slightly inverted from the pressure thus exerted on the tarsal cartilages. The orbicular muscles of the lids also act inordinately, and should the upper lid from any cause become everted, it is, in general, replaced with difficulty. Increased lachrymation is an attendant on the early stages of the disease, but if present subsequently, it becomes so mixed with the purulent discharge as not to be recognized.

From these various causes an examination of the eye, conducted with precision and certainty, is rendered very difficult and often impossible. The conjunctiva we may indeed see; but the state of the cornea and deeper-seated tissues must be judged of from other symp-

toms and considerations; this, of course, does not apply to the slighter cases.

At first the patient complains of pricking, uneasiness, and stiffness of the lids, attended by an intolerance of light, which gradually augment with the increase and spread of the disease, and changes to a severe sense of roughness, as of dust in the eye, with burning superficial pain, which is continual, but aggravated in irregular paroxysms. As the affection proceeds, the eyes become permanently closed, and the pain, distress, and anxiety of the patient are much increased.

In favourable cases the inflammation stops here, and either does not affect the cornea at all, or very slightly. In general, we find the *caruncula lachrymalis* considerably enlarged and prominent, and its surface very uneven, both this and the semi-lunar fold of the conjunctiva being in proportion more swollen than the rest of the conjunctiva, whilst the tarsal margins and the *puncta lachrymalia* are red, inflamed, and prominent, and the latter apertures more or less closed. Without spreading to the cornea, the disease may continue in an active acute state, with an abundant secretion of pus, for some weeks, or even longer, and eventually subside into a passive condition, with great redness and distention of vessels, but without any activity, from the vessels being unable to regain their tone, or the activity may remain, but the disease becomes chronic.

In the third stage, when the disease advances, the cornea becomes involved, and it then but too often leads to affections of the deeper-seated parts and of the cornea, of the most disastrous tendency. If we are enabled to examine the cornea in this stage, we find that it becomes at first dull, and as if breathed upon, and by the continuance and increase of the disease, that it ulcerates, bursts, sloughs, or becomes opaque, from interstitial depositions. With these a great change is effected in the patient's subjective symptoms,—he experiences severe pain both in the head and brow, as well as the eye. The pain in the eye is deep-seated and tensive, arising from the increased contents of the globe pressing on the sclerotica and cornea, rendered sensitive by inflammation, together with the nervous and other textures, which sympathise in the general excitement. The pain in the brow is that sympathetic affection which is so invariable and painful in the inflammatory diseases of the component textures of the globe itself, and which is generally accompanied by frontal headache and pain in the more prominent part of the cheek. These pains undergo various and usually irregular alleviations and aggravations, especially in the eye itself, whilst the pain over the brow is invariably much increased towards night. When the cornea gives way in any manner, the tension and pain are immediately much relieved; yet in the severest cases the process may recur in the opposite eye, and, if not suitably treated, even more than once in the same eye. At length, however, the activity of local and general symptoms subsides, sometimes only after the evacuations of the lens and humours; the external

œdema of the lids is absorbed, and, from a want of balance to oppose the enlarged and altered lining of the lids, the tumefied conjunctiva is partly exposed by everting the tarsal cartilages.

When the disease subsides, the general swelling and vascularity diminish, commencing around the cornea, and spreading to the lids, so that the conjunctiva immediately around the cornea is the first to assume a whitish appearance. This extends till all the conjunctiva oculi is of a comparatively healthy aspect; but the semilunar fold, caruncula lachrymalis, and lids, are much longer in assuming these desirable changes.

The disease, as far as I have seen, almost invariably attacks both eyes, although one may take the lead for a short time. This is more frequently the case with the right eye, which is also in general more severely affected.

The constitutional symptoms are at first slight, and unattended by much derangement of the circulation, the secretions, or of digestion; the bowels are generally confined, and the patient anxious and restless. When the cornea, &c., become involved, great general disturbance is set up; the pulse becomes frequent and hard, and blood when drawn is cupped and buffed; there is great nervous disturbance, so that the patient is restless, anxious, and gets but little sleep. Finally, in the latter stages, or after repeated relapses, much general debility and cachexia may be prominent symptoms, and require attention.

I have often seen this disease assuming the form of a mere *palpebral* affection. Patients have applied who presented externally all the symptoms of the general conjunctivitis, but on raising their lids, the conjunctiva of the globes proved quite unaffected. These are, of course, *milder* cases, and I have seen other examples where, although the whole membrane was involved, the symptoms were much less severe than I have described, and occasioned no permanent injury to the cornea. It is also usually a less severe disease in *children*. Mr. Macgregor (Trans. of a Society for the Improvement of Med. and Chirurg. Knowledge, vol. iii.) describes the disease as it occurred in the Military Asylum at Chelsea, as essentially similar in all respects to the Egyptian malady, but milder. "Its consequences," he remarks, "have not been so injurious to children as to adults; for out of the great number of children that have been afflicted with the disease at the Military Asylum, only six have lost the sight of both eyes, and twelve the sight of one." The more severe and protracted cases occurred in individuals with red hair and of a scrofulous habit. Mr. Middlemore (Treat., vol. i. p. 109) scarcely remembers to have lost an eye affected with acute purulent (not gonorrhœal) ophthalmia occurring in children, when he has had an opportunity of witnessing the disease prior to the occurrence of some of the more serious effects of such inflammation.

When children are crowded together, it appears to assume in them an unfavourable character, for M. Guersent states (Bulletin Générale

de Thérapeutique, April, 1835) that it constantly exists sporadically in the Hôpital des Enfants at Paris, and sometimes as an epidemic. In the wards destined for the youngest children, which are extremely unwholesome (having a constant mortality of 75 per cent.) it is most destructive. In 1835 all these children, and some of the elder ones, were attacked during an epidemic; and complete evacuation of the globe occurred in some cases, especially in several affected with other serious diseases.

Egyptian Malady.—Dr. Vetch (Pract. Treat., p. 196) states that the first appearance of inflammation is observable in the lining of the lower lid. It assumes a mottled appearance, and then a fleshy redness, a little mucus being generally present at the doubling of the conjunctiva at the lower part. From observation Dr. Vetch knew that it might remain twelve hours, and sometimes longer, in this state, before it extended to the conjunctiva of the globe, or even ceased on producing the redness of the palpebra. When the inflammation extends to the covering of the globe, it may be so rapid as to escape observation, or so gradual as to preserve a distinct line, till it arrives at the cornea. In this stage the whole membrane seems equally injected, no space being unoccupied, and it often happens that the patient does not complain until now. The chief uneasiness arises from the feeling of sand or dirt rolling in the eye. This sensation is not constant, but comes on sudden'y, and as suddenly departs, confirming the patient's idea of something extraneous being lodged in the eye. The attacks occur in the evening, or early in the morning, and last an uncertain period. The first stage may, therefore, be characterised by great and uniform redness, without much pain, tension, or intolerance of light.

From the beginning there is a disposition to puffiness in the subconjunctival cellular tissue, giving rise to chemosis and swelling of the lids, which ought, he observes, to be considered as perfectly continuous with the internal surface of the conjunctiva, following its reflection on the lids. The lids swell enormously, and the eyelids become inverted, so as to leave a deep sulcus between the upper and lower lids. The discharge of pus becomes now so considerable as to exceed in quantity that derived from the most violent gonorrhœa, the smallest quantity of which is capable of producing infection.

The tumefaction, which may advance at first farther in one eye, generally reaches its maximum in both about the same time, and now the patient begins to suffer excruciating pain in the eye itself. This chiefly indicates the mischief going on, and from which the patient must be immediately rescued, in order to save the organ. A sensation as if needles were thrust into the eye, with fulness and throbbing of the temples, often precedes the deeper-seated pain. The pain is intermitting, sometimes shifts instantaneously from one eye to the other, and seldom affects both equally; or, without affecting the eye, occurs in a circumscribed spot of the head, which the patient says he can

cover with his finger. Sooner or later one of these attacks of pain is terminated by a sensation of rupture of the cornea, with a gush of scalding water, succeeded by immediate relief to the eye, but generally soon followed by an aggravation of the symptoms in the other. If improperly treated, these symptoms may recur again and again, till exhausted by their own violence; but they do not cease till after many months or weeks. The external tumefaction subsides, and a gaping appearance of the eyelids succeeds, because they are prevented assuming their natural state from the granulated condition of the lining conjunctiva. This may disappear rapidly, or form an inveterate disease.

The swelling and purulency generally prevent an accurate examination of the cornea; but when the cornea sloughs, an adventitious and vascular membrane is often produced, which finally forms *staphyloma*. In some few cases, Dr. Vetch saw the lens and capsule exposed without any external covering, and for a short time the patient saw everything with wonderful accuracy; but as soon as the capsule gives way, the lens escapes with part of the vitreous humour, the eye shrinks, and the cornea contracts into a small horn-coloured speck. The total destruction of one eye generally ensures the safety of the other, and therefore in *staphyloma* it is well to do what nature has left undone, and extract the lens.

A distressing peculiarity of the complaint is its tendency to shift its violence from one eye to the other, so that when we have successfully repelled the dangers from one, the same measures may be required to save the other. An unfortunate feature also is its great tendency to recur, even after the eye itself has recovered its healthy and natural appearance. As long as the lining of the palpebræ continues villous, this accident is liable to occur with all the severity of the original attacks. In every succeeding relapse the danger of vision being impaired becomes greater, and in cases where the cornea has been previously affected, its destruction takes place with a rapidity very difficult for treatment to prevent. The disease is not only liable to return as long as the conjunctiva of the lids remains villous, but it retains its infectious qualities. In fact, the complaint has its origin in the conjunctiva of the lids, is apt to persist in this part for a long time, or is entirely confined to it in others, so that in all cases the inflammation both begins and terminates in the lids.

Partial and Mild Forms.—Mr. Macgregor (Loc. cit., p. 41) has remarked that in some cases the disease evidently began and terminated in the eyelids, whilst the surface of the eyeball seemed only to be affected by its proximity; for they were often in a diseased state for weeks and months after every symptom of the disease in the conjunctiva oculi had completely disappeared. The same gentleman previously remarks that the sebaceous glands of the tarsi were considerably enlarged, and of a redder colour than natural. In Germany a mild

type seems to have constituted the larger proportion of cases, both military and civil. German surgeons have come to the conclusion that a change in the palpebral conjunctiva is the primary and characteristic effect of this disease, and not the result of the inflammation; so far from it, that it is the first manifestation of disease, and the cause of the subsequent inflammatory symptoms. In many cases they have found the complaint arising from contagion, and itself infectious, confined to its original seat, when it appears as a slow chronic affection, giving the patient but little trouble, and often overlooked by him and his attendant.

Effects of Purulent Conjunctivitis.—In severe and unfavourable cases one or more of the following effects of the disease have been noticed:—

Cornea.—The cornea gives way in advanced stages, either from *sloughing*, *ulceration*, or *bursting*. Some writers doubt the occurrence of sloughing in the present form of conjunctivitis; but I have seen more than one example where the eye has been lost before the patient has applied for relief. The sloughing is of two kinds, both of them combined with ulceration; in the first, one-half or even two-thirds of the circumference of the cornea is surrounded by a deep trench of ulceration, constituting what I shall hereafter describe as the crescentic ulcer,—whilst a part or the whole of the enclosed cornea is softened and ash-coloured, and finally separates as a slough. In the second variety the ulcer holds a more or less extended surface in front of the cornea, and from time to time becomes covered with an ashy, ragged surface, from the formation of a superficial slough, on the separation of which the ulcer again regains its transparency, again to lose it on the formation of a fresh slough. Dr. Vetch speaks of sloughing of the cornea (*Loc. cit.*, p. 203), and Mr. Middlemore (*Loc. cit.*, p. 124–5) states that it depends on interrupted nutrition, and always begins in the superficial layers.

Mr. Tyrrell (*Practical Work on the Diseases of the Eye*, vol. i., p. 54, &c.) tells us that the mode in which the cornea is destroyed in purulent ophthalmia generally, is not from an extension of inflammatory action to it, but solely from interruption to its supply of nutritious fluid. The principal supply, he says, of blood to this texture is through the vessels of its conjunctival covering, as may be distinctly seen in some morbid conditions of these structures; for the larger vessels ramify in the conjunctival layer, and send minute branches to the texture of the cornea. The occurrence of chemosis around the margin of the cornea first impedes, and then altogether interrupts, the circulation in the corneal portion of the membrane, and this arises from the pressure at the margin of the cornea by the deposition, and from the tension and displacement of the membrane; for the attachment of the conjunctiva over the junction of the cornea and sclerotic is so firm that it undergoes little or no change, whilst rapid and extensive alterations take place in the membrane around; but its organisation is so delicate

that the circulation is easily interrupted by the combined effects of pressure and tension.* In the treatment I shall have to sketch the remedy which suggested itself to Mr. Tyrrell's mind from these considerations. I may remark, however, that although the treatment proposed is undoubtedly valuable in many cases, still that the reasoning on which it is founded has not passed without contradiction, and is manifestly false in some particulars. As regards its supply of blood the cornea receives vessels from three sources, — First, superficially, from those portions of the conjunctiva which are continued over the cornea; secondly, internally from the iris; and thirdly, which is its chief supply, from trunks continued straight on from the anterior ciliary vessels, before they perforate the sclerotica, running between the conjunctiva and sclerotica. All these supplies communicate around the cornea, so that it would be difficult to interrupt the circulation to any extent, whilst all the phenomena and effects of acute inflammation exist, such as vascularity, ulceration, abscess, opacity, and effusion of lymph; mortification, therefore, probably depends both on the inflammation and the obstruction to circulation.

Ulceration.—The loss of substance from ulceration may be circumscribed or extensive, or else perforate the cornea in several parts, occasionally, as I have remarked, being crescentic, and forming a narrow groove, a short distance from the junction of the sclerotica and cornea, which may nearly extend along the whole circumference, or, in less severe cases, two-thirds or one-half.

Suppuration occurs between the laminae, which become opaque, softened, and their connection loosened; the pus is finally evacuated by ulceration. Whenever the cornea, opposite the pupil, is removed in either of these ways, and the clear lens retained by its capsule exposed, the patient regains accurate vision for a short time, and thinks himself cured; but after a brief period his vision is again entirely lost, either by the evacuation of the lens, &c., and collapse of the globe, or by the formation of an opaque pseudo-cornea in front of the organ.

Bursting of the Cornea more frequently occurs in the situation of an ulcer which has partially perforated its structure, or where the layers have been softened and altered by previous disease; more rarely by a division nearly as clean as if cut by a knife. Its occurrence is recog-

* The views of Mr. Tyrrell are by no means original, as we find it distinctly stated in Mr. Travers' Synopsis (1820), in speaking of the relation of the conjunctiva to the cornea, that the cornea perishes by "the strangulation of the vessels of both textures, as in the excessive chemosis, which destroys on the same principle as the paraphymosis, or the strangulated hernia," p. 91, second edition. Mr. Travers, however, appears to have drawn no practical inference from this view of the subject, and the merit of proposing a remedy by free incisions seems to be justly due to Mr. Middlemore, who distinctly propounded the advantages of this treatment in his Jacksonian prize essay for 1831, his lectures in the "London Medical Gazette," 1832-3, and in numerous parts of the first volume of his Treatise, published in 1834. Mr. Tyrrell proposes radiating incisions, and Mr. Middlemore curved or semilunar ones, which stop short of the greatest diameter of the eye.

nised by a peculiar sensation during a paroxysm of violent pain, attended by the discharge of a small quantity of burning fluid, giving immediate relief to the pain and tension. In one instance Dr. Vetch saw (Account of the Ophthalmia in England since the Return of the British Army from Egypt, p. 60) the cornea without change a short time before it gave way. He examined it again after the patient had felt the sensations of bursting, and found merely a small line extending across the lower segment of the cornea, which remained unaltered after the eye was washed with tepid water. The line was more visible the next day from a slight opacity which accompanied it, and which increased daily, till the greater portion of the cornea was not only opaque, but projected in an irregular cone, with total obstruction to vision.

Opacity in various degrees and forms, either from superficial change, interstitial deposition, or the cicatrisation of ulcers, may exist; in some cases connected with that morbid condition of cornea termed *staphyloma*, either general or partial, or several partial protrusions, like the grains of the blackberry, which is termed *staphyloma racemosum*. Many of these cases of mere opacity, when superficial and slight, recover quickly; and some deeper and denser ones gradually diminish or disappear.

Iris.—When the aperture in the cornea is large, or situated near the pupil, the escape of aqueous humour carries the iris with it, constituting *prolapsus iridis*. In the first instance the pupillary aperture becomes closed, and the iris is protruded forwards by the accumulation of the aqueous fluid behind it, thus forming a mould whereon a new cornea or eicatrix, is formed, and finally constitutes staphyloma; in the second the iris protrudes, closes the aperture, and becomes adherent, such adhesion being termed *synechia anterior*.

Conjunctiva.—The conjunctiva of the lids, as I shall explain under the head of pathology, seems to undergo a peculiar change in this disease, and frequently leads to a granular change and fungous growths. It may also *ulcerate* and contract adhesions to the conjunctiva of the globe, or to the cornea (*symblepharon*), and, finally, the corneal conjunctiva is rendered *vascular* and *opaque* in various degrees. Even after all the other symptoms have passed away the eyes may remain weak and *irritable* for some time.

Amblyopia, or impaired vision, may follow an attack where no injury has been inflicted on the transparent media, dissection showing a turgidity of the vessels in and around the optic nerve, with a partial or entire loss of the pigment of the choroid.

Eyelids.—The eyelids may be *inverted* or *everted* for the time, or permanently. The temporary eversion comes on after the absorption of the external œdema of the lids, and in some few cases forms a prominent symptom, being attended by great tumefaction, and a granulated state of the protruded conjunctiva, as is represented in fig. 4, plate 1, of Dr. Vetch's Treatise. In these cases, on the subsidence of

the external œdema, the swollen conjunctiva loses that counterpoise which the swelling afforded it, and the action of the orbicularis forces it outwards. If the protrusion be not immediately returned, the upper part of the eyelid and retroverted cartilage have the effects of a ligature on the protruded parts; and, as the swelling increases, the stricture becomes still stronger by the efforts of the muscle to bring the tarsus into its right position. (Vide Vetch's Treatise, p. 227-8.) The proper plan of treatment is, therefore, to diminish the vascularity, and reinvert the lid, securing it, if necessary. Eversion of the lower eyelids results from extreme relaxation, and is gradually cured as the structures recover their tone. This condition is exhibited in plate 3, fig. 2, of Dr. Vetch's Treatise.

Formation of pus does not take place either in the eyeball generally, or in any of the chambers.

Diagnosis.—The secretion of pus, not mucus, distinguishes it from catarrhal conjunctivitis, hence the only other affection with which it may be confounded is the gonorrhœal form. It may be known from this latter by its almost invariably attacking both eyes, whilst the gonorrhœal disease is confined to one, at all events for some time. The history of the disease, where the patient does not wish to deceive, is also sufficient, as gonorrhœa almost invariably still exists, or the discharge from another person has been applied to the conjunctiva. The discharge also is thicker, and all the symptoms are more violent; its commencement is quicker, and the lids are free from granular changes, &c.; it occurs also in single cases, whilst the purulent conjunctivitis affects several persons living together.

Prognosis.—Dr. Vetch states that the total strength of the second battalion of the 52nd was somewhere about 700 men. 636 cases, including relapses, were admitted into the hospital from August, 1805, till the same month in 1806; of these, 50 were dismissed with the loss of both eyes, and 40 with that of one. Müller (*Erfahrungssätze*, p. 159) treated 1604 cases, including 200 relapses, in the Prussian garrison of Mentz, in three years and a half, and of these only 1344 were restored to perfect vision. It is also asserted that, out of 30,000 cases occurring in the Prussian army from 1813 to 1821, blindness followed in 1100.

Where the disease is seen sufficiently early, and is properly treated, the prognosis is not unfavourable. If proper treatment be *not* adopted, the disease produces fearful havoc. Thus, in the French slave-ship *Rôdeur*, crowded with 160 negroes, the disease came on from ordinary causes; and, being treated improperly, at the termination of the voyage 39 patients were left totally blind, 12 had lost one eye each, and 14 had opacities of the cornea. Of the sailors, 12 lost their sight wholly, 5 lost one eye each, and 4 had considerable opacities and adhesion of the iris to the cornea. (*Bibliothèque Ophthalmologique*, par M. Guilié, p. 74.) As far as I have observed myself, the disease is most unfavourable in disordered states of the general health. In the Egyptian

malady, those suffered most whose health had been much deranged by irregularity and intemperance, and who had been the longest exposed to the predisposing causes.

Causes.—The most powerful *predisposing* causes are those originating in the crowding of individuals, as want of pure air, noxious effluvia, close personal intercourse, &c., which are aggravated if aided by want of cleanliness, insufficient clothing, scanty or unwholesome diet, the use of the same washing utensils, towels, &c. Next must be enumerated unfavourable conditions of the atmosphere, and the more common causes of inflammation, which render the affection so common in Egypt; for there the excessive heat of day is followed by night-chills and heavy dews, and the land is periodically covered by water, which is only evaporated by the sun's heat. With these are combined the powerful light and glare from the sandy surface, and the quantity of fine sand which is raised into the air with every breath of wind. We can readily explain how the disease gradually ceases, when bodies of affected individuals become separated and dispersed into healthy situations, by the weakening or withdrawal of the predisposing causes.

The *exciting* causes may be common or mechanical sources of irritation, sudden draughts of cold air to the eye while the body is heated, &c. When the persons affected are of a low station in life, the affection thus commenced almost invariably attacks most, or all the members of their immediate family, who dwell under the same roof. Such families are crowded together, many often sleeping in one bed, are rarely sufficiently attentive to cleanliness, and use the same towels, sponges, and soap for washing. This latter consideration leads me to speak of the *infectious* nature of the disease.

Infection and Contagion.—No doubt can exist that *direct application* of matter from an affected to a healthy eye will produce the disease, but may not perhaps invariably; just as two individuals may be equally exposed to the same danger of contracting gonorrhœa, one takes the disease, whilst the other escapes unharmed. Mr. Macgregor (Transactions of a Society, &c., vol. iii. pp. 51-4) mentions three instances where the disease was produced by the accidental spirting of matter into the eyes of nurses engaged in syringing the organs of the boys in the Royal Military Asylum. Dr. Guillié introduced the discharge from the eyes of children suffering from purulent conjunctivitis under the eyelids of four blind children, and the disease was in each instance produced. Dr. Vetch lays it down as an axiom, in the commencement of his chapter "On the purulent ophthalmia of the British army," that, from whatever cause inflammation of the conjunctiva may originate, when the action is of that nature or degree of violence as to produce a puriform or purulent discharge, the discharge so produced operates as an animal virus, when applied to the conjunctiva of a healthy eye. Graefe frequently produced the disease in dogs and cats by the application of the matter to their eyes; and finally, the extension of the disease, by the return of the British and French armies

from Egypt to troops, &c., in Italy, Sicily, Malta, Gibraltar, France, and England, clearly prove its contagious nature, the progress of the complaint having been traced from the affected to the healthy detachments. Some, indeed, have contended, that in Egypt, where the affection has been endemic for ages, it has never been considered contagious; and Müller failed in several experiments to communicate the disease to animals. A Mr. Mackesey also applied the matter from the eyes of three patients to his own eyes, then walked a mile or two, whilst a sirocco wind blew the dust and sand in every direction, and, finally, wore linen soaked in the discharge over his eyes all night, occasionally moistening its surface, and pressing it to insure its contact with the mucous surface, without producing any severe inflammation. These objections, however, prove nothing, inasmuch as positive proof exists of its contagious nature.

The disease, however, is but rarely extended by the direct application of the discharge, but through the medium of a confined and vitiated atmosphere, occurring most severely, and extending most rapidly, and to greater numbers, when many persons are crowded together, and confined in a limited space. Müller* arrived at this conclusion from careful and extensive observation. He concludes that it could be produced by contact; but his experience had furnished him with no direct proofs. In all the cases he saw, the patients had been exposed for a considerable time, and repeatedly, particularly at night, to an atmosphere rendered impure by an assemblage of patients. The affection was never communicated to the friends and relations of patients, who were allowed to visit them in a separate apartment, for the limited time of half an hour, notwithstanding the close contact in embracing and caressing, which would necessarily occur in the meetings of parents and children, brothers and sisters, &c. The same author also informs us (p. 82), that at Mentz many nurses and medical attendants suffered, as well as the President of the Hospital Commission, and an inspector, who, in the assiduous discharge of their duties, passed much time in the wards.

At the present day, purulent conjunctivitis commences in the first instance, doubtless, from common causes, and extends to other individuals, mainly by the operation of a poisonous influence transmitted through a confined and limited atmosphere, such as that of a small close room, especially during the night. Constant close intercourse, sleeping in the same bed, and the use of the same washing apparatus, &c. &c., tend, of course, to spread the disease after it has once commenced.

Dr. Vetch found the time which elapses between the application of the virus and the appearance of the disease shorter than occurs in gonorrhœa. In one of Mr. Macgregor's cases it took place in twelve hours, and in three nurses, in the order of five, seven, and ten hours

* Erfahrungssätze, p. 77.

subsequently. Dr. Vetch apprehends that the discharge possesses an infectious property as long as the lining of the lids remain red and villous.

Pathology.—The inflammation appears to produce, at a very early stage, a peculiar change in the lining membrane of the lids, which continues as long as the disease lasts, and finally assumes the shape of granular conjunctivitis. Professor Walther states, that “the proper seat, the birth-place, the nest of the disease, is always, and in all its degrees, the conjunctiva of the eyelids. Hence extends its destructive operation partly into the substance of the eyelid, partly to the eyeball, the conjunctiva oculi being the medium by which the disorder is conveyed to the proper tunics of the globe.” Dr. Werneck, of Saltzburg, also insists especially on the necessity of attending to the state of the eyelids in all patients affected with the disease; for, he remarks, they are “le veritable terrain où l’ophthalmie Egyptienne germe et developpe successivement tous ses effets.” The change consists in loosening and thickening of the palpebral lining, which, after some time, becomes reddish, velvety, and granular, with small vesicles interspersed, or an exanthematous structure difficult to describe. Finally, it becomes changed into a fleshy, sarcomatous, somewhat condylomatous mass, with an abundant purulent discharge. Müller describes three stages of the disease, In the first, the conjunctiva lining the tarsi has a villous appearance, and darkish red colour, these changes extending for about a line beyond the orbital edges of the cartilage; in the second, it looks as if strewed with coarse sand, and has a more granular appearance. It may go on for weeks or months in this stage before it passes into the third, or more serious gradation. In the third, the disturbance is of a more violent kind, producing luxuriant morbid growths of granulations and warty elevations.

Treatment.—The *intentions* to be kept steadily in mind during the treatment of the more severe forms are, first and foremost to prevent the extension of disease to the cornea; secondly, to subdue the inflammation, and prevent its lingering in a chronic form; and thirdly, to cure any remaining disease in the palpebral conjunctiva, which renders the patient constantly liable to relapse, and keeps up the infectious nature of the discharge. During the first stage, and the earlier portion of the second, *blood-letting*, in most cases, is more especially advisable. Its general abstraction is most beneficial where the pulse is full, strong, and hard, the skin hot and dry, and the patient vigorous; whilst if the general powers are feeble, the pulse deficient, or the skin cold and moist, it is injurious. As Dr. Jacob justly remarks,* it may be very well to bleed, and otherwise reduce those who have been well fed, and have enjoyed all the comforts of life; but the practice is utterly inadmissible in a country where the poor are abandoned to a state of destitution, and, if not absolutely starved, are so ill-fed, and

* Cyc. Pract. Med., vol. iii. p. 207.

clothed, and lodged, that frequently no healthy action can be roused until the constitution be invigorated. In Dublin, it is often absolutely necessary to place a patient, a few days after the first attack of purulent ophthalmia, on full diet, consisting of animal food, with ale or porter, accompanied by the administration of bark, or other tonics. There can be no doubt that, when the age and strength of the party admit, a full general bleeding, carried to the verge of syncope, is the most efficacious plan of treatment, and at the same time more economic of the strength than several smaller blood-lettings. Dr. Vetch found the early adoption of this treatment reduced the number of those in whom the disease advanced to the second stage, and rendered the symptoms less violent. The patient should be placed erect, sitting or standing, and bled from a moderate-sized puncture in the arm, not only until the eye assume nearly its natural appearance, but as a *sine qua non* until the cessation of all uneasiness. This treatment is almost sure to prevent the return of the severe symptoms, and the necessity of its repetition; and, says Dr. Vetch, in every case, however violent the tendency of the disease may be, its destructive termination will infallibly be prevented, and with much less expense to the patient, than by smaller and more frequent bleedings. He says, further, that of 3000 patients it never failed, when assisted by the other remedies mentioned. But venesection carried to this extent is, of course, not applicable in young children, or weak and sickly subjects.

In the severe and active disease venesection should be followed by a liberal application of *leeches* around the eye, and in the milder forms *cupping* at the nape of the neck, or the use of leeches, must constitute the sole means employed for the abstraction of blood. The leeches should be placed at a moderate distance from the lids, and never on the lids themselves.

Purgatives should never be neglected in the earlier periods of the disease. An active purge of calomel with the potassio-tartrate of antimony may be administered at night, and followed by some suitable medicine in the morning, to the third or fourth time. *Tartar emetic* may be continued subsequently in nauseating doses, if the patient be of a powerful sthenic constitution; and in these cases the *diet* should be reduced both in quantity and quality. On the contrary, if the patient be very debilitated and cachectic, a generous diet with *tonics* may be absolutely necessary, especially at the commencement of the treatment. In all cases the *head* should be kept considerably *elevated*, and the eyes *freely exposed to the atmosphere*. So favourable an opinion did Dr. Vetch entertain of the effects of a free exposure to the atmosphere, that he says he would even, in favourable weather, risk the delay of a journey in the early stage, provided that the eyes were freely exposed to the air, and that he never saw any other than the best effects attend a change of place even when the second stage had commenced.

Simultaneously with the use of blood-letting the *external* skin of the eyelids should be carefully blackened by the *nitrate of silver*; this simple operation being repeated, if necessary, every third or fourth day. As far as my own experience extends, I have found infinitely more benefit attend the external application of this remedy than its introduction in any shape or form between the lids. No period is too early for its use, nor any too late, as long as the palpebral linings present any vestiges of the disease. The discharge should be washed away from between the lids frequently by a solution of half a drachm of *alum* in a pint of decoction of *poppy-heads*, or a weak solution of the liq. sodæ. chlor. The purulent forms of conjunctivitis are the only diseases of the eye which admit of the introduction of powerful remedies between the lids, with the view of setting up a new pathological action. Strong solutions of nitrate of silver are those most generally recommended. Dr. O'Halloran rubs the inner surface of the eyelids with sulphate of copper, or drops a solution of nitrate of silver into the eye; Müller recommends solutions of sulphuric acid or acetate of copper; Mr. Briggs the oleum terebinthinæ; Dr. Vetch the undiluted liquor plumbi diacetatis, &c. Mr. Guthrie advises that ten grains of nitrate of silver, reduced to an impalpable power, should be incorporated with a drachm of hog's-lard, adding fifteen drops of the liq. plumbi diacet., to ensure its complete trituration. This ointment is to be applied after the discharge has been washed away, and the lids moved freely up and down, till whiteness of the conjunctiva be produced. If such measures be employed, it should not be till after the activity of the symptoms be reduced by depletion, nor should they be continued if violent chemosis and deep-seated pain of the eye come on. My own observation leads me to say, that pure astringents are more valuable than stimulants as external applications, and hence that five or six grains of alum to the ounce of water is safer and more efficacious than the nitrate of silver. When these remedies are employed the discharge should previously be washed away by the solution of alum in poppy-decoction, and then carefully introduced between the lids, drawing down and everting the lower one,—repeating these proceedings two or three times a-day.

Mr. Walker, of Manchester (Oculist's Vade Mecum), considers the nitrate of silver, applied in substance to the conjunctiva, as the sheet-anchor in the treatment of purulent ophthalmia; in which Drs. Littell, Ricord, &c, concur. It is necessary to apply it freely. Mr. Walker tells us, that in the early stages it is difficult to evert the lids sufficiently. In this case we must insinuate the remedy gently beneath the margin of each lid, and allow it to touch as much of the conjunctival surface as we can, and also as much of the chemosed surface as possible. "In cases of this kind, we need not be under the slightest apprehension as to any unpleasant effects being likely to follow the free use of the nitrate of silver: it may be safely allowed to remain in contact with the

conjunctiva for a few seconds." In the early stage the remedy should be freely applied at least once in each day, until the chemosis and the puriform discharge are so much lessened, as to leave no doubt that the violence and danger of the disease have passed away. Mr. Walker, on some occasions, has repeated the applications morning and evening, more particularly when ulceration of the cornea had occurred to any considerable extent. If it be properly and efficiently used, he thinks that little else can be required, whilst without it he should entertain but little expectation of a successful issue.

Although we should prefer this plan of treatment to the ointment of Mr. Guthrie, or the stimulants previously mentioned, it is nevertheless one we do not adopt, being perfectly satisfied with the results of that already described.

In the second stage, where the local disease has advanced to the production of complete chemosis, all ordinary modes of treatment constantly failed in Mr. Tyrrell's experience, which induced him to adopt a plan for its relief, most gratifying in its results, and simple in its application. (Tyrrell's Treat. vol. i. pp. 72-5.) This remedy was free division of the chemosed part, so as to relieve the tension of the conjunctiva, and to allow of the escape of fluid from the subjacent cellular tissue, and thus get rid of that which he conceived to obstruct the circulation of the cornea. The incisions are to be made through the sclerotic portion of the conjunctiva and its subjacent cellular tissue, in a radiating manner, beginning at the margin of the cornea and extending towards the edge of the orbit, but avoiding immediately the transverse and perpendicular diameters of the globe, that the large vessels passing to the cornea might not be injured. Mr. Tyrrell has found this treatment successful beyond his expectations, invariably saving the cornea in the most violent cases if it has not previously suffered, or preventing any increase where mischief has already been produced.*

In the third stage, when extensive ulceration or sloughing has taken place, any examination of the organs should be conducted with the greatest caution and delicacy, taking care not to press on the eyeball itself; since a rough and violent mode of proceeding is almost sure to force out the lens and humours, and destroy the organ. In this stage tonics and good diet are in general absolutely necessary. It is well to employ some simple cerate, or dilute ung. hyd. nit. oxyd. melted, along the edges of the lids, night and morning, in those stages where the lids *adhere* to one another. Where the disease is mild or confined to the *lids*, local blood-letting by leeches, &c. may be sufficient, with one or more active aperients, the nitrate of silver externally, and the dilute alum collyrium to the conjunctiva.

* The suggestion of Mr. Wardrop to give relief to the distention of the eye by evacuating the aqueous humour through a puncture of the cornea, is more ingenious than useful, inasmuch as the fluid is reproduced in a few minutes, and the cornea healed in a few hours; in fact, I have never seen the proceeding of the slightest benefit.

Preventive Measures.—These consist of a careful avoidance of the predisposing and exciting causes : hence the apartments or buildings occupied should not be crowded, and due attention must be paid to cleanliness and ventilation, avoidance of other affected individuals, &c. When the disease occurs in regiments, schools, &c. all the affected individuals should be separated from the healthy, frequent inspections should be made of these latter, and the greatest attention be paid to their ablutions ; solutions of chlorine or the chlorurets should also be applied to the organs of the affected, and individuals who finger the parts should wash their hands in them, whilst the atmosphere of the apartment in which the diseased reside should be occasionally purified by chlorine.

GONORRŔŔEAL CONJUNCTIVITIS.

Synonyms.—Gonorrhœal ophthalmia, gonorrhœa oculi, Benedict. Ophthalmia gonorrhœica vera, Beer. Blephar-ophthalmia.

Almost all the symptoms and consequences (excepting, perhaps, the condition of the lining membrane of the lids) are essentially similar to the foregoing form in the gonorrhœal conjunctivitis, only more violent. Mr. Lawrence (*Ven. Dis. of the Eye, and Treat., &c.* p. 260, &c.) distinguishes two varieties of the conjunctival disease—the *acute* and the *mild*.

The acute variety is one of the most violent and rapidly destructive inflammations to which the eye is subject, and is attended by a discharge similar in its commencement, progress, and appearances, to ordinary gonorrhœa, with which it is always connected. The disease is comparatively uncommon, but affects the male much more frequently than the female, and the right eye* than the left.

The *symptoms* are nearly similar to those of the more violent cases of purulent ophthalmia. The affection presents three stages ; the first consisting of inflammation with but slight increase in the discharge ; the second of a profuse, thick discharge of yellow pus ; and the third, of an extension of morbid action to the cornea. The swelling of the conjunctiva is more considerable than in purulent ophthalmia, and the chemosis so great as, in many cases, nearly to hide the cornea. The eyelids are also greatly swollen, particularly the upper, which hang over, and sometimes completely cover the lower. In general the redder the external skin the more violent will be the inflammation. At first the discharge is thin and in small quantity, becoming thicker, more abundant, and yellow in proportion to the violence of the disease. Lastly, the patient complains of the most severe and agonising pain in the eye and head when the cornea becomes affected. The duration of these stages varies under different circumstances ; the two

* M. Carron du Villards remarks that the inoculated disease almost always affects one eye, and he has observed that in left-handed individuals it was the left eye which was affected, and *vice versa*. (*Guide Pratique*, vol. ii. p. 542.)

first are generally short, and it is not till the commencement of the third that the patient usually applies for relief.

It will be unnecessary to go over again the *effects* of this inflammation, which are exactly the same as those described in the previous division; but as *sloughing* of the *cornea* is much more common in gonorrhœal conjunctivitis, I will pause to describe its phenomena more minutely. Previous to any loss of vitality in the cornea it becomes dull and cloudy, from an imperfect degree of opacity and loss of its reflective powers, being either general or especially marked in that portion about to slough. As soon as it has ceased to form a part of the living frame it becomes perfectly dull, opaque, and somewhat buff-coloured, resembling at first, as Mr. Lawrence remarks, a portion of wetted leather. As soon as sloughing stops, or is arrested, it becomes separated by a well-defined line from the rest of the cornea, which, in part, regains its normal appearance, whilst the slough is loosened and appears ragged and soft. The extent of the slough varies considerably: it may consist of the whole cornea, two-thirds, one-half, or less, either extending completely through all the layers and the membrane of Descemet (aqueous capsule), so that on its separation the lens and capsule are exposed, or leaving the aqueous membrane entire, it is then protruded forwards in the shape of a transparent vesicle termed *ceratocele*; or finally the cornea may slough layer by layer, the event depending mainly on the condition of the conjunctivitis, and of the patient's health.

Diagnosis.—In gonorrhœal conjunctivitis the phlyctenular and granular condition of the palpebral lining is absent, and it does not lead to the chronic form of granular conjunctivitis. In a case of the gonorrhœal form which Mr. Lawrence saw in the very outset, the complaint began at once in the conjunctiva oculi, whilst the purulent variety commences in the lids. I believe, however, that a disease identical with, or at all events, not to be distinguished from, gonorrhœal ophthalmia, may be produced by the application of leucorrhœal matter, or any acrid, unhealthy muco-purulent discharge to the conjunctiva.

Prognosis.—The prognosis is more unfavourable in this form of the affection, from its rapidity, severity, and destructive consequences, so that irreparable mischief has often been effected before medical aid is obtained. If seen at its commencement, or shortly after, it holds out a fair opportunity for treatment to be successful, but even under these circumstances it is well not to promise too much. Out of the fourteen cases related in Mr. Lawrence's "Treatise on the Venereal Disease of the Eye," loss of vision took place in seven, from sloughing, suppuration, or opacity of the cornea. In two of these one eye was lost. Sight was restored in the remaining five cases, with partial opacity of the cornea, and anterior adhesion of the iris, in three of the number. When both eyes are successively attacked, it is generally less severe in the second.

Causes.—The subjects to be inquired into are, first, whether the disease originates in actual contact of gonorrhœal matter; secondly, whether it has a constitutional origin; thirdly, if it arise from metastasis; and, fourthly, if sympathy has anything to do with its origin.

With respect to the first consideration, Jacob reports a case in which gonorrhœal conjunctivitis was produced by the direct and accidental contact of matter from the urethra of the patient himself, then suffering from gonorrhœa. Wardrop, Lawrence, and Delpech, have detailed cases of a similar nature; as also others in which the disease arose, and pursued afterwards a course fatal to the organ, in consequence of the eye or its appendages having become infected by the contact of a towel or sponge used previously by gonorrhœal patients. These cases, however, are exceptions; in the great majority the disease cannot be traced to any application of infectious matter, so that some other cause must exist.

Has it a constitutional origin? Gonorrhœa is, at first, a strictly local disease, and may exist for some time, go through different stages, and at length terminate, still retaining a strictly local character; but in some individuals it undoubtedly gives rise to a series of severe constitutional symptoms. Such are prolonged and severe rheumatic inflammation of the synovial membranes (gonorrhœal rheumatism) conjunctivo-scleritis, and iritis, which I shall describe hereafter.

Now, I believe that gonorrhœal conjunctivitis is generally one of the earlier indications of constitutional contamination, and my view is strengthened by the very curious train of symptoms in cases related by Sir B. C. Brodie, Mr. Lawrence, &c. These cases commence with discharge from the urethra, followed by purulent ophthalmia, and this, again, by rheumatism in the synovial membranes, with or without inflammation of the sclerotic and iris, lasting for many weeks or months. *Without any fresh infection* these attacks recur again and again in the same individual. The phenomena do not, however, always ensue in the same order, for now the purulent ophthalmia may be the first symptom, followed by the rest. One gentleman mentioned by Sir B. Brodie had suffered as many as nine attacks in the course of twenty years, in three of which purulent ophthalmia were the first symptoms. Mr. Lawrence (*On the Eye*, p. 279) is inclined to refer the occurrence of the ophthalmia to the state of the constitution, without being able to point out in what that state consists, and to regard it as a pathological phenomenon analogous to those successive attacks of different parts which are observed in gout and rheumatism. He has never seen the disease, arising from constitutional causes, in the female, although direct infection operates equally on both; and Beer states that he has observed it only in young, robust, and plethoric men. Mr. Lawrence attributes the exemption of females to differences in constitution, and to the different morbid influences exerted by the urethra and vagina.

Does gonorrhœal conjunctivitis ever arise from metastasis? Beer,

Scarpa, Richter, and others, attribute the disease to this influence. They state that the original gonorrhœal discharge is suppressed, and that the ophthalmic affection occurs in consequence. This is the opinion, also, of physicians of the modern German school, who recommend, in consequence, as one of the principal indications for treatment, that the urethral discharge should be restored. In the inaugural dissertation of Dr. Scherrer, of Baden, he mentions, as his second indication for treatment, "*Effluvium mucosum urethrale suppressum restitatur (restituari?) oportet.*" According, however, to the experience of several British practitioners, which fully accords with the little experience I have myself had of the disease, the discharge is not suppressed; and if the term metastasis be meant to signify merely a change of seat, it is obviously incorrect in the present instance; but if something more be signified, some influence mysterious and unexplained, I must confess myself most hostile to the theory.

The fourth consideration is sympathy between the urethra and conjunctiva. Dr. Scherrer takes this view of the case where gonorrhœal conjunctivitis arises independently of infection or metastasis; and Mr. Middlemore partially supports that view. I have no hesitation in saying that such an opinion is unfounded and incorrect.

Treatment.—The measures treated of at length in the previous division of purulent ophthalmia should be adopted with decision and energy. In the early stages, venesection, carried far enough to influence the constitution decidedly, should be adopted *once*, in all cases being guided by the constitutional powers of the patient, and his state and condition; but reducing the powers by frequently-repeated depletion is unnecessary and injurious. The same *local* measures are necessary as in purulent ophthalmia, and Mr. Tyrrell's plan of *scarification* is even more advantageous here than in that variety. M. Decondé, from numerous experiments both on animals and on himself, infers,—1st. That chlorine and the chlorurets are certain disinfectants for gonorrhœal and ophthalmic contagions, and that they are to be preferred to all others. 2nd. That to preserve soldiers free from ophthalmic infection it is not enough to use lotions, but that the atmosphere itself should have chlorine suspended in it. 3rd. That medical attendants who finger affected eyes should dip them in chlorine, to prevent the carrying of virulent matter from one to another, and that the same recommendation must be given to those who handle parts affected with gonorrhœa (*L'Examineur Médicale*, Oct. 24, 1841).

Mild form of Gonorrhœal Conjunctivitis.—All the symptoms are less severe in this form: the redness is less intense, the membrane less swollen, and the discharge varying from a few streaks of whitish mucus, which adhere to the eyelids, and lie between the lids and globe, to a tolerably abundant muco-purulent secretion of a yellow colour. The complaint yields readily to mild antiphlogistic treatment, aided by the local use of astringents, or of the nitrate of silver solution, and, when properly managed, is rarely attended with much danger to the

organ, even in its most violent shape. I have seen this mild type of the disease more than once in the female.

PURULENT CONJUNCTIVITIS OF NEW-BORN INFANTS.

Synonyms.—Ophthalmia neonatorum, purulent ophthalmia of infants.

This severe and often fatal disease of the eye—fatal to vision from culpable or ignorant neglect—occurs soon after the birth of the little patient, usually from within two to four days; although a form of the same disease, not to be distinguished by the symptoms, may come on when it is several weeks old. There are, in fact, two species, one arising from the application of irritating matters to the eyes during parturition, and which comes on shortly after birth; the second originating in common causes, and not appearing until after some weeks have elapsed.

Slight indications of irritation are first experienced about the lids and eye, which the nurse comforts herself and the parents by calling a mere “cold.” The lids become slightly red and vascular, the eye is closed, and the light distressing, whilst a little mucus collects about the inner canthus and eyelashes, and, by drying, glues the lids together. If the conjunctiva of the eyelids be examined in the early stage, it will be found of a bright scarlet colour, and of a soft, thick, villous appearance, showing that this is the tissue in which the disease commences. Lachrymation and sneezing, on exposure to a bright light, sometimes attend this stage. These early symptoms remain without change for various periods of time in different instances; sometimes passing on to the conjunctiva of the globe in twelve hours, and sometimes remaining without material change for several days. As children are sometimes born with opaque corneæ, it has been supposed that the disease sometimes occurs before birth.* Sooner or later, however, if the disease be neglected, it passes on to the conjunctiva oculi, and manifests all the worst symptoms of purulent ophthalmia. The inflammation and redness extend to the external skin of

* Mr. Walker has detailed a case which he terms “congenital ophthalmia” because he thinks that no reasonable doubt can be entertained that the appearances were occasioned by purulent ophthalmia, which occurred before birth. It is narrated as follows:—Mrs. T.’s child, when first brought under my notice, was six months old, and the mother, a very intelligent person, informed me that at the time of birth his eyes exhibited the same appearances as were now observable. The disease had run through its entire course previously to birth, for, according to her account, there was no puriform discharge, inflammation, or intolerance of light noticed at any time subsequently. The cornea of one eye had completely sloughed, the eyeball had sunk, and, of course, not the slightest vision existed. More than one-half of the cornea of the other eye was opaque; through the remaining transparent portion a part of the pupil could be discerned, and the iris and cornea appeared almost in contact. The transparency gradually extended, and more of the pupil became accessible to light: thence, though vision was very imperfect when I last saw the child, yet it appeared to be gradually improving.—*Vade Mecum*, p. 56. I shall recur to this subject under the head of opacity of the cornea.

the eyelids, which becomes greatly swollen, tense, and smooth, being an increase of the slight redness and vascularity which is one of the earliest symptoms. The slight mucous discharge becomes converted into an abundant secretion of pus, which is apt to accumulate between the lids, and to stream over the cheek when these are separated, sometimes becoming bloody during the height of the affection, and changing to a foul sanious ichor when the cornea has extensively sloughed. With these exceptions, in all the examples I have seen, and they are very numerous, the discharge has been of a bright yellow colour. The swelling of the palpebral conjunctiva is so great that the upper lids often become everted, from the action of the orbiculares, especially by the child's crying, or during an effort to examine the cornea. Such an eversion should always be rectified at the time; for, if neglected, the deformity is frightfully increased by partial strangulation, and may then be difficult to reduce.

If the inflammation be unchecked, it extends to the cornea, and speedily involves that tunic, and, through it, the deeper tissues, in some of those injurious or destructive processes which I have already enumerated. The most frequent, as far as my own observation extends, are, opacity, sloughing, and ulceration, or a combination of the two latter. Previously to sloughing the cornea loses its polish, and becomes cloudy. This disease destroys vision most commonly in a gradual manner, not by a slough of very considerable extent and through the whole depth of the cornea at once, but by a succession of sloughs; the last lamina of the cornea, on becoming exposed, is protruded by the pressure from within, and ulcerates, allowing the iris to escape, and sometimes advancing till the lens and humours are evacuated, and the globe collapses.

When the cornea has been irreparably injured, or sloughed to some extent, the acute symptoms subside. The lids lose their tension and bright colour, the skin being wrinkled, hanging loose, and of a dusky hue; the bright redness and swelling of the conjunctiva subsides, and the discharge becomes thin, dark-coloured, and scanty. In this stage we can see the changes which have previously occurred, and the condition they are in at present, and can follow either their extension or improvement.

The constitutional symptoms are not considerable during the early stages of the disease, but they become severe when the cornea is attacked. There is great restlessness, want of sleep, and crying; the bowels are much deranged in some cases; and, as severe lesions are produced, the expression becomes haggard, the face pale, and the strength much reduced.

This form of conjunctivitis affects both eyes, although it generally commences in one; or, both eyes suffering together, one is for some time more severely affected than the other. The time occupied by the disease in its different stages varies considerably in different cases; altogether, it may last from one to two or three weeks. It does not

give rise to the chronic granular inflammation of the conjunctiva of the lids, as occurs in the adult.

Prognosis.—Dr. Jacob (loc. cit., p. 216) states that he thinks it probable that the loss of vision from this cause is four times greater than that from all the causes of common purulent and gonorrhœal ophthalmia put together; and Mr. Lawrence (On the Eye), that it causes more blindness than any other inflammatory disorder that happens to the eye. The reason of this frequency in the injury to vision does not so much depend on the intractable nature of the disease as in the lamentable ignorance and prejudice of nurses, and, but too frequently, of medical attendants. The affection is allowed to proceed, under the persuasion of its being a mere “cold,” and the topical application of a little warm water to the lids is all that is adopted, too frequently, till the cornea is densely opaque, or has suppurated, ulcerated, or sloughed. We may often determine the condition of the disease, and form a prognosis, without looking at the cornea; as long as the lids are tense, shining, and florid, the cornea is free from irremediable changes, although on the verge of destruction; but if they are purplish, relaxed, and corrugated on the surface, with a thin, scanty, and offensive discharge, we may be sure that the cornea is partially or entirely destroyed. Under either of these circumstances, however, the medical attendant should warn the friends of the danger of an opacity, or of destruction of the organ following; for, as Dr. Jacob remarks, if he dismisses the patient without this precaution, or if he makes any application to the eye without explicitly announcing the extent of the injury, the reproach of having blinded the child will be fastened on him by those who, from culpable neglect, ignorant confidence in their own opinions, or sordid love of money, had caused so lamentable a misfortune.

The danger is not dependent on the intractability of the disease, for there is a singular contrast between its violence and the rapidity with which serious effects are produced, and the certainty and readiness with which it yields to timely and proper treatment. Out of several hundred cases of the disease which I have seen I am not acquainted with a single failure when treatment was commenced previous to the cornea being involved; hence the prognosis is very favourable when the case is seen sufficiently early. At the early stage at which this disease occurs, absorption and deposition are carried on with such vigour and activity, that lesions which in the adult would have proved fatal to vision and permanent in their duration, are often partially or entirely removed in the infant.*

Causes.—The disease may arise in the infant, as well as in the adult, from the application of highly irritating matters to the eye, as the leucorrhœal or gonorrhœal discharge, or from the operation of common causes. I believe that that form of the disease which comes on almost immediately after birth *invariably* depends on direct infection,

* An opaque spot is sometimes formed on the capsule of the crystalline.

either from a gonorrhœal, chronic, leucorrhœal, or stimulating mucous discharge from the mother's vagina being applied to the infant's conjunctivæ. Although the mother may not have suffered, either previous or subsequent to parturition, from gonorrhœa or leucorrhœa, the discharge which lubricates the parts during labour may become preternaturally stimulating when excessive vascular excitement exists, and in all cases I believe that a careful inquiry will detect one or other of these causes.

The disease is most frequent and destructive in weak and delicate children, and among the children of the poor, and proportionably rare among those of the higher classes. It is more common also in premature infants and in twins, in cold and damp weather, and in foundling hospitals. Langenbeck (*Neue Chirurg. Biblioth. b. 3, p. 208*) states the curious fact, however, that in the lying-in hospital of Vienna, where the mothers are generally labouring under either leucorrhœa or gonorrhœa, but where the infants remain with them, the disease is not common; while in the foundling hospital, where the infants are deprived of their mothers, and are often half dead from cold and starvation before they are received, it is very prevalent.

Treatment.—At the West of England Eye Infirmary this disease is treated by the application of a weak solution of alum to the lids and conjunctiva, aperients, and suitable constitutional measures, without leeching, scarification, or nitrate of silver; and so successful has this treatment proved, that during the years I attended this institution I never knew an instance of failure, unless the cornea had become involved before it was instituted.

The majority of practitioners recommend the application of one or two leeches, either to the swollen upper lid or near the eye, especially in robust and plethoric infants; but, as far as I have seen, this is always unnecessary, and, in the majority of instances, positively injurious. (See predisposing causes.) I find that the experience of M. Reveille-Parise leads him to condemn the use of leeches, blisters, and emollient applications. (*Med. Chir. Rev.*, July, 1842, p. 188.)

To regulate the *bowels* nothing answers better than small doses of mercury with chalk, with powdered rhubarb, one grain of the former with two or three of the latter, repeated according to circumstances. Where the infant is several weeks old, and a more active aperient is required, scammony may be combined. In very feeble and sickly children, it may be necessary to give *tonics* from the very commencement, and when the cornea has sloughed and exhaustion resulted, upholding the strength gives the only remaining chance of preventing the repeated occurrence of the same mischief to fresh portions of the tunic. Perhaps quinine is the best remedy under these circumstances—a grain may be well mixed with about sixteen grains of powdered white sugar, and divided into eight powders. Mr. Tyrrell has found Battley's solution of the yellow bark of great service, in the proportion of one or two drops, with syrup, and Mr. Lawrence recommends the resinous extract.

To *cleanse* the eyes, a very dilute solution of the liq. sodæ. chlorid. may be employed, thrown with the greatest gentleness first against the lids, and then between them. The utmost injury may be induced by unnecessary violence, and therefore large powerful syringes should not be employed. The glass syringe I possess is so constructed that it would be impossible to throw the stream of fluid with a violence sufficient to occasion mischief. Two or three times a day a solution of *alum*, containing one or two grains to the ounce, should be dropped between the lids, after washing away the purulent secretion. From the very first I should be inclined to paint the *external skin* of the eyelids with *nitrate of silver*, using a solution of five grains to the ounce, and passing it once carefully over the lids by means of a camel's-hair brush, repeating it, if necessary, with an interval of a few days. To prevent the adhesion of the lids, we must also order a little simple *cerate* to be liquefied and passed along the tarsal margins night and morning. In all cases, the prophylactic measure should be carefully taken of cleansing the eyes of newly-born infants from collections of mucus or other adherent matters.

SECT. X.—GRANULAR CONJUNCTIVITIS.

Synonym.—Granular conjunctiva.

Definition.—Inflammation of the conjunctiva, attended by a gradually augmenting and extending papillary roughness or inequality of surface, accompanied with a secretion of mucus.

I shall describe two varieties of the disease—the active and the passive—the intervening chasm being filled up by every intermediate grade in nature.

Active Form.—After a severe, or in some cases a peculiar, inflammation (vide purulent ophthalmia of adult) of the palpebral conjunctiva has existed for some time, an unpleasant sense of roughness or rubbing on the ball of the eye, on any of its motions, is complained of; producing increased lachrymation, vascular distention, spasmodic closure of the lids, with much distress and pain, and rendering the eyes almost useless; this assemblage of symptoms, when less severe, the patient calls weakness of the eyes. If we invert the lids, in this stage, and hold them a little way removed from the globe of the eye, we shall find that the changes of granulation have commenced in that portion of the conjunctiva reflected from the globe to the lids—at the angle of its reflection—commencing in the upper lid, and always progressing with greater rapidity and severity in that situation than in the lower. The granulations are small, more or less conical, firm, very vascular, and of a bright scarlet colour; the conjunctiva oculi opposed to these is vascular, and also scarlet, whilst the lids appear swollen and vascular externally, with intolerance of light, and lachrymation. In more chronic and slighter cases, the projections are very firm and of a lighter colour. As Müller (*Erfahrungssätze*, p. 37) justly observes,

their colour varies according to the degree of inflammation ; hence we see all gradations, from the darkest blood-red to the palest brick-colour.

As the disease proceeds, these symptoms increase in severity, and others, which are constitutional, become superadded. The irregular prominences advance towards the edges of the lids, until the whole surface of the palpebral conjunctiva becomes eventually crowded with small, firm, elevations, more or less conical, many of them, however, very rough and irregular, and some larger than others.

The progress and completion of these changes in the palpebral conjunctiva are not only attended with the mere local symptoms of inflammation and change of structure, but, in addition, with those which result from the substitution for the naturally smooth and beautifully soft surface of the healthy conjunctiva, of a rough, inflamed, and thickened membrane, constantly rubbing over the front of the cornea and conjunctiva oculi. The constant mechanical irritation of these parts leads to great distension of their vessels and chronic inflammation of their structure ; they become thickened, highly sensitive, and very vascular, whilst the front of the cornea is rendered cloudy and rough on the surface from vascular opacity. A few large scarlet trunks, with several smaller diverging branches, ramify in its structure, increasing in number in proportion to the activity of the affection, with a proportionate increase in the thickening and opacity of the tissue, until in very severe cases it acquires the name of *pannus*. In some cases there is much intolerance of light, attended with profuse lachrymation and spasmodic closure of the lids. The inflamed conjunctiva pours out a scanty but thick muco-purulent secretion, which glues the lids together during the night, and which may be seen on and between the granulations themselves.

The patient complains of a very severe superficial burning pain in the eyes, with a sensation of sand and roughness, weight over the brows, and frequently general headach, and, from the opacity, intolerance of light, and spasm of the orbiculares, almost complete loss of the use of the organs. A chronic febrile condition of the system accompanies the more severe cases, denoted by a hard pulse, impaired digestion, dry skin, and nocturnal chills, followed by heat and thirst.

Passive Type.—In this form of the complaint the symptoms commence and progress in the same way as I have already explained ; but, when fully formed, the irregularities of surface produced are much larger (in the aggregate), softer, and smoother, though irregular in shape, or of a dark, or sometimes very pale livid colour, and bathed in a profuse watery mucous secretion. The effects of such bodies on the surface of the globe are much less severe than in the active form ; the conjunctiva eventually becomes thickened, and loaded with dark-coloured vessels, and the front of the cornea irregular and semi-opaque ; but there is comparatively little pain, no lachrymation, and little, if any, intolerance of light, or spasmodic closure of the lids. In many

of these cases the whole structure of the lids is cedematous, of a dark colour, and loaded with vessels.

In all these patients the general health is more or less deranged, hectic fever being present in the severest cases. We find the tongue loaded, the breath offensive, the digestion disturbed, the bowels irregular, the skin either pale, relaxed, and moist, or dry and harsh, the perspiration partial and offensive, the urine unnatural, with other similar phenomena. In a few cases more decided symptoms of anemia are present, such as pallor of the countenance, lips, lining of the mouth, and general surface, with a feeble, jerking pulse, &c.

Granular conjunctivitis affects both lids, its progress is slow, and its removal a work of time, however judicious the treatment. Its duration is very uncertain, but in general it is a disease of months or years, rather than weeks; for, whilst any vestiges of the palpebral disease remain, the patient is liable to relapse from unfavourable conditions of the weather, imprudence in diet, alterations in the health, &c. The chief *effects* are pannus, ulceration of the cornea, inversion, eversion, and other chronic affections of the lids.

Causes.—The most fruitful source of this disease is, undoubtedly, purulent or muco-purulent ophthalmia (not infantile or gonorrhœal). I have seen several cases which have originated solely in the indiscriminate and repeated use of the nitrate of silver, introduced between the lids, either as a strong solution or in substance. They have commenced with some trifling conjunctival affection—a little pain or roughness—which the patients disregarded, until they accidentally passed some eye infirmity, or called on some medical attendant of the family in which they were servants; but in every instance they positively denied having suffered from anything more than slight pricking, redness, and feeling of sand in the eye, until they became the victims of the use of what they termed “hot drops,” and which, when placed between the lids, caused them most dreadful suffering, generally lasting for some hours after each application.

Pathology.—The nature of the disease is essentially inflammatory, since it originates in inflammation, and is cured by the same means which relieve that process and its consequences. It has not the remotest connection with “granulation,” as the term is employed in connection with the repair of ulcerated surfaces,—for such never springs from a sound surface,—nor does it ever essentially consist of enlargement of the Meibomian follicles, since it commences in and spreads from the reflection of the conjunctiva to the lids, where these glands are absent, and does not assume the shape and direction of these bodies. The granulations are, in fact, nothing more than the natural papillæ of the palpebral conjunctiva enlarged, partly from inflammatory engorgement of vessels, and partly from the interstitial deposition and organisation of lymph.

Treatment.—A judicious combination of local and constitutional treatment proves far preferable to either separately. In the active

form of the complaint blood may be taken locally, either by cupping from the back of the neck, or by the application of leeches around the organs, repeated as frequently as the circumstances of the case may suggest. Blood may also be drawn locally by dividing the inflamed blood-vessels themselves, scarifying the palpebral conjunctiva, or shaving off the inequalities to a level with the surface. In performing this operation, the lid should be everted, and the conjunctiva cut with the shoulder of a lancet, that is, drawing the edge from its fixed extremity towards its point. It is true that the granulations are reproduced as long as the inflammation on which they depend continues; but the operation is useful, and leaves no inequality of surface, when skilfully performed, after the cure of the disease. In the passive type, however, blood-letting is uncalled for. In some cases, a gentle action of mercury on the gums is beneficial.

Astringent applications to the conjunctiva are valuable remedial measures; but they require adaptation to obtain their full effects. A very dilute solution of the acetate of lead (two grains to the ounce) is best suited to very acute cases, and the undiluted liq. plumb. diacet. to the more passive, managing the intermediate forms according to their characters.

In some very mild cases, nothing more is required than to evert the lids, and to rub the surface of the granulations with the sulph. cupri, keeping the lids everted for some minutes after its use, and washing the cauterised surfaces with a gentle stream of tepid water from a syringe before we replace them.

Dr. Hays, of Philadelphia, has found a saturated solution of common salt contribute more to the cure of chronic granular ophthalmia than any other application. He says that it affords more marked and prompt relief than any other remedy, when the eye is irritable, with injection of the conjunctiva oculi, and lachrymation.

As far as I have seen, no local remedy is so beneficial as the application of the nitrate of silver to the external skin of the eyelids, combined with attention to the health.*

SECT. XI.—PUSTULAR CONJUNCTIVITIS.

Synonyms.—Aphthous conjunctivitis. Ophthalmia pustulosa.

Definition.—Partial inflammation of the conjunctiva, of the catarrhal type, attended with the production of vesico-pustules.

This generally mild and tractable disease forms a connecting link between catarrhal and strumous conjunctivitis; for whilst vesicles and

* In many chronic derangements of the health, with hepatic disorder, especially where the quantity of bile poured into the intestinal canal is diminished, the extract of taraxacum and inspissated ox-bile are highly valuable remedies. I had occasion to recommend their employment under the head of chronic simple conjunctivitis. By far the best preparations of these I have seen are manufactured by Mr. Hooper, pharmaceutical chemist, of Pall-Mall East, who employs but a very moderate degree of heat in the evaporation.

pustules often occur in the catarrhal affection, the pure pustular disease almost always attacks individuals of what is termed the strumous constitution. Strumous conjunctivitis is a disease of childhood. Pustular inflammation rarely occurs before ten years of age.

Symptoms.—The disease commences with a sense of sand in the eye and slight watering, but is unattended by intolerance of light or pain. The conjunctiva appears red in a more or less diffused patch, sometimes occupying but a very limited space, at other times as much as two-thirds of the conjunctiva oculi. The redness possesses the soft, tumid, villous appearance of catarrhal conjunctivitis; and like it, is uniform, and pours out a slightly increased mucous secretion. In this inflamed portion, generally near the cornea, one or more vesicles are formed, which increase in size and acquire a yellowish, or in some cases, a completely straw-yellow colour, from the partial or complete conversion of their contents into pus. After a few days their contents become either absorbed or discharged by ulceration, and the affection subsides, sometimes leaving superficial ulceration of the conjunctiva.

It is generally confined to one eye, and lasts from three or four days to a week. Having once occurred, it is very prone to attack the same individual from slight causes, but rarely leads to any serious consequence.

The *treatment* may consist of the exhibition of a purge during the attack, with a collyrium of four grains of acetate of lead to the ounce of water, as a local application, and giving mild tonics with an occasional aperient during the periods which intervene between them.

SECT. XII.—STRUMOUS CONJUNCTIVITIS.

Synonyms.—Ophthalmia scrofulosa. Phlyctenular ophthalmia.

Definition.—Inflammation of the conjunctiva attended with the formation of imperfect vesicles and great strumous irritation of the terminal filaments of the fifth nerve. It is essential that the student should understand that the term “strumous ophthalmia” is restricted to this particular disease, although the other inflammations of the conjunctiva are greatly modified in their duration, effects, and obedience to treatment, when occurring in such constitutions. Strumous disease, also, is not confined to the conjunctiva, but affects the lids, cornea, aqueous membrane, iris, and retina. It is rare after puberty.

Strumous diseases derive their peculiarities from the state of system in which they occur, and before proceeding to consider the phenomena of strumous conjunctivitis, it will be well to pass the nature of the constitutional derangement briefly in review.

Pathology of Constitutional Struma.—Struma, in one form or another, is the most prevalent affection of damp, cold, and variable climates. Like many other constitutional diseases, the peculiar form possessed by the parents is almost sure to be handed down to the offspring, or a state of system extremely prone to take on similar

disordered actions. There can be no doubt that several varieties are included under the term *struma*, having certain pathological elements common to all; thus, tubercular phthisis, strumous diseases of the bones and joints, diseases of the eye, &c., are apt to attack individuals independently of one another, and rarely occur together in the same person, although no doubt can exist of their dependance on an identical constitutional contamination. In fact, a merely predisposed condition of system is, in common parlance, termed a "scrofulous" constitution; such, for instance, as the fine skin, clear delicate complexion, light hair, long eyelashes, and precocious intellect of one form; the dry harsh skin, lymphatic temperament, soft flaccid condition of the muscles, with dulness and apathy of mind of another; or the foul, dry, swarthy-coloured skin, swollen countenance, and dark hair, &c. of a third. These peculiarities, when unconnected with other strumous indications, show simply a congenitally predisposed condition of system, since the actual and active presence of constitutional struma depends not on any physical condition of the body, but on an actual contamination of the blood by *imperfectly assimilated matter*. This state of the blood itself is dependent upon a deranged condition of the process of *primary and secondary assimilation*, struma being invariably preceded and accompanied by a disordered condition of the chylopoietic viscera—"strumous dyspepsia," by which an imperfectly elaborated chyle finds its way into the circulation; and secondly, by an equally disordered process of secondary assimilation, by which more of this morbid matter is conveyed into the blood, or accumulates in the absorbent glands and vessels, imparting a peculiar and characteristic feature to the established disease. The matter of tubercle is the invariable and peculiar product of strumous disease, being separated from the blood, as a diseased secretion, into the areolæ of the cellular tissue, on the surface of serous and mucous membranes, &c, or is interrupted in its progress through the lymphatic system. Tubercle is found to consist chiefly of albumino-gelatinous matter, and there can be little doubt that the phenomena of the constitutional disease depend mainly on the introduction and circulation of imperfectly assimilated albumino-gelatinous matter with the blood, whilst the local affections spring from the deposition of tuberculous materials in certain situations, and the induction of inflammation, &c., &c., in order to remove such a source of irritation from the system. A state of general debility is a striking feature of the presence of struma, and hence, if an inflammation arises from any other than a constitutional cause, it, as well as the latter, is modified accordingly.

The reason why particular organs and tissues are, as it were, selected by a disease having so wide a diffusion as the volume of circulating blood, is dependent on an attraction which subsists between such parts and the peccant materials contained in the blood. Not only are these matters attracted by the affected tissues—either

from the nature of their functions, or from injury or disease going on in them—but sufficiently so to separate them from the blood, and either to retain and fix them in connexion with the tissues, or to pour them out on free surfaces; subsequent processes being generally employed to rid the system of their presence altogether. From the abundance of the material, and the constancy with which it is renewed, we can readily understand how so many organs are involved in severe cases. In all diseases depending on a specific virus, or some noxious material circulating with the blood, I believe that the local affections springing from it are set up by the mutual and elective attraction between the tissue and the poison, the ultimate aim being to eliminate it from the system. Such, for instance, is the case in syphilis and gout, &c. Dr. Budd of Bristol, in a very able and interesting paper on the symmetry of disease,* has clearly proved that the essential condition of each individual lesion is dependent on the detention of morbid matters, and their being held in union or affinity with the part affected.

All the best modern writers acknowledge the invariable presence of disturbed digestion in struma. This form of dyspepsia, together with a diseased condition of secondary assimilations, I have stated to be the *fons et origo mali*, the source of that contamination of the blood whence the local phenomena spring. The late Dr. Todd states, in his *Essay on Dyspepsia*, in the *Cyc. of Pract. Med.* vol. ii. p. 654, in which opinion Sir J. Clark fully concurs, that strumous dyspepsia presents a more characteristic feature of this habit of body than any physiognomical portrait which has yet been drawn of it. For upon whatever temperament the disordered constitution called “*scrofula*” engrafs itself, this form of dyspepsia will also there be found; and therefore, being constantly present with it, preceding and accompanying the various symptoms which issue from it, it would be contrary to all reason to refuse to it an important share in the developement of this disordered habit, and in the production of the local affections which have hitherto too much engrossed the attention, to the exclusion of a proper consideration of the constitutional disease.

The derangement of the organs of digestion presents some slight diversity of symptoms in different cases. The abdomen is unnaturally protuberant, and entozoa are very apt to generate in some part of the intestinal canal. The tongue is frequently red at the tip and edges, and the papillæ prominent, whilst the centre is covered with a slimy greyish mucous coat. At other times, the whole tongue is covered with a thin opaque mucous covering, through which the papillæ project, or is distributed in more or less circular confluent spots, often with a brownish dry streak down the centre, in the morning. The appetite for food and drink is very uncertain. Sometimes the patient is thirsty, with a ravenous appetite, whilst at others there is no desire for food, with unaccountable dislikes and

* *Med. Chir. Trans.* vol. xxv.

fancies. The bowels are generally confined, with occasional attacks of diarrhæa, depending, probably, on the irritation which the accumulated matter in the intestinal tract ultimately set up. The evacuations are almost constantly unnatural in smell, colour, and consistence, mainly attributable to the deficiency or morbid qualities of the bile; generally they have a putrid odour, are of a lightish colour, a clayish consistence, and are mixed with much mucus, undigested, or partly digested food, and sometimes blood. Uneasiness, or pain, either in the stomach or in some part of the abdomen, is often complained of. The breath is foul, and there is, in general, much irritation about the nose and mouth, and sometimes the rectum, so that the child picks and scratches these parts continually, and often occasions unpleasant sores. The sleep is seldom perfectly calm and undisturbed; it is either broken suddenly with a start, or the little patient is restless, grinds his teeth, talks, or even screams. The throat suffers in advanced cases from repeated inflammations, and the tonsils undergo chronic enlargement, but only in some cases, and in these also the upper lip enlarges, and the mucus membrane of the nose is almost always engaged. The temper becomes irritable and fretful, and the child cries from slight causes.

The tissues formed from a blood so imperfect are rarely healthy, being soft, flaccid, and deficient in tone. The surface generally, is often pale, the skin being in some cases harsh, dry, and subject to eruptions, in others soft, relaxed, and pasty, and in a third set of a fair waxy appearance with conspicuous veins, in which latter there is almost always a tendency to hectic, with copious partial night sweats. The urinary organs are very prone to disease, and the urine either deposits the lithates on cooling where the patient is hectic, or it is pale and abundant, speedily becoming alkaline and undergoing decomposition, the triple phosphate of ammonia and magnesia being deposited on cooling. The reconversion of the tissues into blood is a fruitful source of its contamination, and the absorbent system is very apt to suffer in the performance of its office, especially where it is more exposed to external influences.

The general symptoms in all forms of struma are those of defective power, either with or without excessive nervous irritability. In the latter case the slighter or more confirmed indications of hectic are invariably present; for, as I have shown in the *Edin. Med. and Surg. Journal*, Jan. 1843, the essential elements of hectic consist of excessive nervous irritability and deficient general power, or debility. The pulse is either soft, feeble, and slow, or preternaturally quick and irritable, but deficient in real power; the muscular system, (as a general rule) feeble and incapable of much or prolonged exertion; whilst the nervous is in one set of patients languid and deficient in its functions, and in another morbidly active and irritable.

The causes of struma are chiefly those derived from congenital and hereditary peculiarities, but there can be no doubt that the disease

may be induced in a healthy individual if he be exposed for a sufficient length of time to injurious agencies of sufficient intensity, such as confinement to an improper diet, whether excessive or deficient, especially if indigestible, dark and unhealthy habitations, deficient clothing, and a want of due and necessary exercise, &c.

As I have stated before, the manifestations of this constitutional condition are not invariably the same under all circumstances, but particular groups of symptoms constitute distinct varieties. Tubercular pthisis presents peculiarities, and the more common indications of struma are rarely present, notwithstanding that the pathological elements are similar, and the products of diseased action identical. Again, where the lymphatic glands undergo strumous deposition and inflammation, the ears are sore, and the skin is affected with eruptions; it is then that the lids and eyes are more especially subject to attacks of inflammation, &c., strumous conjunctivitis forming one of the list.

It is probable, however, that strumous conjunctivitis not only springs from, or is modified by, this state of system, but also that the ophthalmic division of the fifth nerve suffers from the propagation of irritation from the abdominal ganglionic system, which, in accordance with a general law in such cases, affects the terminal filaments. The excessive irritability of the fifth nerve, and the intimate connexion which subsists between the symptoms and the state of the digestive organs leads me to this conclusion.

What I have endeavoured to establish in the foregoing remarks may be expressed under the following propositions:—

That a physical conformation of body, predisposed to struma, does not necessarily imply a strumous constitution. That a peculiar derangement of primary and secondary assimilation is the source from whence the disordered habit is produced and maintained. That the essential pathological element of the constitutional disease consists in a contamination of the general mass of the blood by imperfectly assimilated matter, which, when it is detained in the mesenteric, or general absorbent system, or is subsequently separated from the blood, shows itself chiefly as altered albumino-gelatinous or tubercular matter. That local strumous diseases, having a constitutional origin, arise from an elective attraction between this matter and the tissues, its separation from the blood, and the institution of subsequent processes to eliminate it from the system. That different groups of symptoms, constituting distinct varieties, occur at different ages and in different individuals from the same constitutional source, the deposition of tubercle being common to all, and that these varieties are often distinctly hereditary. That strumous conjunctivitis is dependent on a propagated irritation, manifested in the terminal filaments of the ophthalmic division of the fifth nerve, with more or less inflammation of the conjunctiva.

Strumous conjunctivitis rarely if ever occurs after puberty, but

chiefly during primary or secondary dentition, whilst strumous corneitis is often met with at or after puberty. The disease is sometimes severe, and of short duration, especially a first attack, but after several renewals it is apt to linger in a very chronic form, with frequent augmentations from every exposure to change of weather, or increased derangement of the digestive organs.

Symptoms.—On seeing a child with strumous conjunctivitis, the great intolerance of light, and the firm spasmodic closure of the lids, (photophobia and blepharospasmus) especially attract our attention. The orbiculares palpebrarum keep up a constant pressure on, and are a source of constant irritation to the affected membrane, by the severe spasm they constantly suffer when exposed to even moderate light. The little light which passes through the lids, acting on them and on the conjunctiva, is unbearable, so that the child keeps its hands firmly pressed against the organ, and leans its face upon the nurse's shoulder, or, if in bed, buries it in the pillow, even in comparative darkness. In chronic cases, the edges of the lids are, in this manner, kept in an almost inverted condition, and the eyelashes are forced under them, in contact with the conjunctiva, being retained in this position, and greatly augmenting the distress. I believe that the affection is greatly increased, and that it is almost entirely maintained by this constant source of irritation, and that to remove the irritability of the lids and conjunctiva is to cure the disease.

When we come to examine the eye, the greatest difficulty is experienced in separating the lids, in some cases actual force is absolutely required. The necessary exposure to light occasions a profuse discharge of tears, and on attempting to raise the upper lid it often becomes inverted, whilst the cornea is rotated out of sight upwards and outwards. If we succeed in fairly viewing the eye, we observe a bundle of vessels forming a cone, with its apex towards the cornea, generally slight and terminating in a small acuminate imperfect vesicle, termed phlyctenula. There may be several of these, in different periods of their progress, some incomplete, others collapsed, and forming a minute depression, or dimple; some in a state of ulceration, either slight or severe; and others, again, cicatrised, leaving an opaque speck or albugo. They are situated most commonly at the junction of the cornea and sclerotica, sometimes further in on the cornea, and less frequently on the conjunctiva beyond the cornea.

Phlyctenulæ terminate either by an absorption of their contents and the formation of a small transparent depression, termed a dimple, or go on to ulceration of various degrees and severity. These ulcers are generally transparent, and not very deep; but, in unfavourable cases, and if not attended to, they will sometimes become funnel-shaped, and penetrate deeply, so as to allow the aqueous capsule to protrude in the form of a transparent vesicle. The base of the ulcer is placed superficially, diminishing in size as it penetrates the different layers of the cornea. If the destructive processes be not now

checked, the aqueous capsule bursts, the aqueous humour escapes, and frequently a portion of the iris protrudes from the wound, forming what is termed *myocephalon*, from its resemblance to the head of a fly. The cornea is rendered opaque by their cicatrization, forming small *specks* where the damage has been slight, denser and larger forms of *leucoma* when more severe, and an indelible opacity, with a central black speck, when the ulcer has penetrated and the iris protruded, or a limited *staphyloma*, owing to the pseudo-cornea, adherent to the iris, being thrust forwards whilst soft by the aqueous fluid. Strumous opacities, whether from interstitial deposition or cicatrization, excepting the two latter kinds, will generally disappear or lessen after a longer or shorter period, partly from the character of the disease, and partly from the activity of the reparative and absorbing powers in young subjects, being quickened by an appropriate treatment.

As the attacks multiply, and assume more and more a *chronic* form, the child acquires a peculiar physiognomy: the brow is contracted; the cheek, alæ of the nose, and angle of the mouth are drawn up, to protect the eye in some measure from the influence of light. From the constant flow of stimulating tears over the lower lids and face, and from the susceptibility of the little patient to take on diseased action, the face becomes excoriated, or covered with an eruption. The scalp, behind the ears, and the external ear itself, often suffer from vesicular or pustular disease in this stage. The eyelashes, as I have mentioned, often become turned under the lids, and the edges of the lids themselves are more or less inverted. The eyes and lids are now much more vascular, and the conjunctival covering of the cornea frequently thickened and vascular, sometimes so much so as to deserve the name of *pannus*. When the cornea has been much affected during the progress of repeated attacks, we often find the anterior chamber enlarged, and the iris, in some instances, dull. Amaurosis, strabismus, atrophy, onyx, effusion of blood between the layers of the cornea, &c., have also been described as occasional consequences.

One or both eyes may suffer, either simultaneously or consecutively. One is in general more severely affected than the other, or the severity passes alternately from one eye to the other. It is in the chronic stage that the deeper-seated tissues are occasionally involved.

A variety of strumous disease exists, in which the intolerance of light (photophobia scrofulosa) and spasm of the lids exist without inflammation, or the production of phlyctenulæ.

Pathology.—The intolerance of light in this disease is usually attributed to an affection of the retina; but I believe that the true retina has nothing to do with its production. I think that, if we examine its symptoms and cure, we cannot fail to trace it solely and exclusively to the ophthalmic division of the fifth nerve. The fifth is a nerve of sensation, nutrition, and secretion, supplying common sensibility to the eye, and all the other contents of the orbit, and overruling the

function of the lachrymal gland. If we ask any physiologist how the muscles of the orbit derive their sensibility, he will reply, through the fifth nerve, but that the filaments which actually supply these muscles are unknown. Now I believe that the retina itself is in direct communication with the fifth, through the medium of filaments distributed with those of the optic nerve—not being, as Magendie thought, the actual nerve of vision, but the source of common sensibility to light, and the medium of impressions on the pupil through the lenticular ganglion. It is true I can offer no actual anatomical demonstration of this opinion; but in this I am not singular, as in the case of the muscles just alluded to; nevertheless, I will proceed to show my reasons for thinking so.

If a small foreign body, as a grain of sand, get between the upper eyelid and globe, a temporary condition, very analogous to strumous conjunctivitis, is induced; the patient manifests the greatest intolerance of light, the orbicularis palpebrarum is affected spasmodically, *the pupil contracts to a fine point*, and the eye waters profusely. When we come to examine the eye, as in the strumous affection, we find it turned upwards and outwards, and the same difficulty with the lids. Now, in this case, it is obvious that all these symptoms depend entirely on an irritation of the fifth nerve; but it is equally clear to my mind, that although the fifth nerve produces contraction of the pupil *per se*, still, under ordinary circumstances, the light must fall on the retina to occasion this change. The experiments of Fontana prove that the mere action of light on the iris is insufficient to produce contraction of the pupil, unless the retina be simultaneously affected. Daily observation also proves, that if the fifth nerve be in a state of irritation, the action of light on the eyelids alone is amply sufficient to produce the same effects.

The experiments of Magendie tend to confirm this opinion of the function and communication of the fifth nerve, and not, as he imagined, that it was the true nerve of vision; for, although the retina was apparently insensible to intense light from the division of the fifth, it does not necessarily follow that the animals were blind. His experiments were performed on rabbits, in whom division of the fifth nerve produces contraction of the pupil; and even here, when he admitted solar light, and concentrated it on the retina by a lens, the animal closed its lids. Mr. Walker, in some very ingenious and interesting remarks (*Philosophy of the Eye*, p. 276), clearly proves that, under similar circumstances, sensibility to light is lost, but not the proper functions of the retina. In a patient of his, all the parts supplied by the fifth nerve were paralysed on one side of the face, and here there was a striking difference in the sensibility of the two eyes to light. The healthy eye could not bear for a single instant the same amount of light which produced no impression on the eye of the paralytic side—the flame was distinctly visible to the eye, but it produced

no irritation. He was treated on the combined antiphlogistic and mercurial plan, and speedily recovered. It was interesting to observe, that as common sensibility was restored, the eye became again susceptible to the irritating influence of light.

Again, where persons are quite blind, sensibility to light often remains. Cases of complete amaurosis are occasionally met with where the iris moves actively and freely, and where the patients can tell by their sensations the difference between light and darkness, without being able to see at all. These cases appear to dissect, as it were, the different portions of the retina, and show its separate functions; the true retina is paralysed by disease in some part of the visual nervous system, whilst the sensitive functions of the fifth and the motor of the third nerves remain intact.

It is clear, therefore, that the intolerance of light, the spasmodic closure of the lids, the profuse lachrymation, the contracted state of the pupil, and the involuntary efforts to exclude the light in strumous conjunctivitis, are not dependent on any derangement in the state of the retina itself, but on irritation of the various filaments of the fifth nerve, which supply these different parts, including the retina. That this is the true pathology of the affection, those cases show where all these symptoms are present without phlyctenulæ, or any notable redness; and, moreover, as I shall presently show, that to remove the great susceptibility of this nerve is to cure the attack.

Prognosis.—Under ordinary plans of treatment, this disease is extremely serious, from its duration, frequency of recurrence, and results. After years of anxiety and suffering, it is true that frequently the *vis medicatrix naturæ* affects most astonishing cures, and that corneæ which have been opaque and vascular are restored to nearly their normal condition of beauty and transparency; such, however, is not always the case, and our prognosis should not be too sanguine. When the case is treated in the mode I shall presently discuss at length, the attacks may always be stopped soon after their occurrence, and hence are infinitely less liable to occasion permanent mischief. The state of the organ, however, when first seen, must determine the judgment pronounced in each individual case.

Causes.—The exciting causes are chiefly two, atmospheric vicissitudes and accidental aggravations of the permanent disturbance of the intestinal canal; hence the disease comes on from sudden changes of weather, exposure to damp and cold, to easterly winds, &c., or from errors in diet, constipation, and the like.

Treatment.—When the nitrate of silver is applied to the outside of the lids, in the manner already described, it completely subdues a recent attack within a few hours, and a chronic case after two or three applications, with the interval of three or four days between each. As soon as the remedy has had time fully to act on the fifth nerve, it completely relieves the intolerance of light, the lachrymation, and the

spasmodic strivings of the orbicular muscle, and hence rescues the patient from that constant irritation and pressure which maintains and aggravates the affection.

In a little boy, four years old, I had an opportunity of treating an attack of strumous conjunctivitis and purulent ophthalmia in different eyes, at short intervals of time. The strumous attack was subdued at once; but in about a week after he was brought to me with purulent ophthalmia of the opposite eye. I at first used leeches, purging, and strong solutions of the nitrate of silver, which subdued, without curing the complaint. At this stage I applied the nitrate of silver to the outside of the lids, with an immediate and almost astonishing benefit; and by a second application, made about a week subsequently, a complete cure was effected.

In some of the more chronic cases of strumous conjunctivitis I have seen great benefit ultimately result from the introduction of stimulating substances between the lids, but I by no means wish to recommend what I believe to be unnecessary. In one instance some cantharadine cerate was given to the friends of a little patient, with directions to keep up slight soreness behind the ears, but from some unaccountable stupidity it was introduced between the lids instead. Very severe symptoms resulted from this proceeding; but these were subdued in a few days, leaving the eyes perfectly free from the chronic intractable disease which had previously occupied them.

On first seeing a case of strumous conjunctivitis, besides the application of the nitrate of silver to the outside of the lids, it is advisable to administer three or four grains of the hydrargyrum cum cretâ, or two of calomel, with one or two grains, or only half a grain, of quinine (according to the age, &c., of the child), and to follow this up, about six hours afterwards, with an appropriate dose of rhubarb, ginger, and sulphate of potash. If the smaller powder be given at night, the aperient should be delayed till next morning. Where the case is chronic it is very serviceable to repeat this practice about twice every week or eight days, and where the child voids worms it is best to make the freeing of the intestinal canal a special indication for treatment.

The *diet* should be nutritious, in moderate quantity, and taken at regular intervals, especial care being used that the little patient masticate it well prior to its being swallowed. Of course every injurious or indigestible article must be studiously avoided; such, for example, as pastry, new bread in every form, sweetmeats, crude vegetables, fruit (unless it be soft, fully ripe, and in small quantity, as strawberries, &c.) *Early hours* should be enforced, both for retiring to rest, and rising in the morning. Sufficient *exercise* is very important, such as riding, walking, playing in their turns; but fatigue is injurious. The *mind*, also, should be kept *employed*, though never overworked.

As *purgatives*, the combination of a mercurial with quinine, followed by rhubarb, &c., as I have already mentioned, is the best mode of occasionally stimulating and strengthening the chylopoietic functions.

As *tonics*, if the child be pale, and the solids deficient in tone, the ammonio-citrate of iron, in small doses, two or three times a day, should be administered; but if the circulation be active, and the nervous system irritable, quinine, exhibited in the same manner, has succeeded best in my hands. In these latter patients cold or tepid sponging of the various parts of the entire cutaneous system successively, followed by brisk friction, I have seen most successful. In the former, when the skin is dry and rough, warm bathing about once a week, also followed by active rubbing with a coarse towel, or the flesh-brush.

SECT. XIII.—EXANTHEMATIC CONJUNCTIVITIS.

Inflammation of the conjunctiva, generally of a very mild catarrhal form, but sometimes, when severe, of a muco-purulent or purulent character, attends the progress of the eruptive fevers; and in the case of small-pox is often attended by severe and dangerous corneitis.

MORBILLOUS AND SCARLATINOUS CONJUNCTIVITIS.

An attack of measles is preceded and accompanied by much watering of the eyes, more or less catarrhal conjunctival inflammation, intolerance of light, and a secretion of mucus, which glues the lids together during sleep. This condition of the eye accompanies the ordinary symptoms of a severe catarrh, and rarely requires much interference. Some unguent may be employed to prevent adhesion of the lids, and warm fomentations to the lids and eyes.

Scarlatinous conjunctivitis is generally similar, and requires similar treatment. In either case, should the inflammation assume a more severe character, the nitrate of silver should be applied to the outside of the lids. In strumous subjects troublesome affections of the lids, &c., are apt to follow, and require subsequent management.

VARIOLOUS OPHTHALMIA.

During the course of small-pox inflammation of the conjunctiva occurs, as in the other eruptive fevers, with various degrees of severity. Almost invariably small-pox pustules form on the lids, and give rise to very considerable swelling from œdema, thus increasing the conjunctivitis, closing the eyes completely for several days, though rarely occasioning much ultimate damage. Occasionally, however, a very severe and destructive form of corneitis* complicates this condition, and but too frequently leads to staphyloma, and complete loss of vision; and, thirdly, a secondary form of corneitis is still more apt to come on at, or shortly after, the decline of the general eruption.

Palpebral Form.—Nothing is more common in small-pox than closing of the lids from the formation of pustules on the delicate inte-

* The common opinion that small-pox pustules form on the cornea is erroneous.

gument investing them. We hear of affected individuals having been perfectly blind for several days, and then recovering their vision on the decline of the eruption. In all such cases the lids and conjunctiva are the only structures involved, and the blindness arises solely from the closure of the lids, dependent on the great œdema and swelling which the pustules occasion from the delicacy of these organs, the quantity of loose cellular tissue they contain, and the adhesion of the cilia, by the discharge adhering and drying on them. Pustules are apt to form also on the edges of the lids, and have been seen on the conjunctiva, even under the lid itself.

Merely a variolous affection of the conjunctiva and lids is little, if at all, dangerous to vision, but, nevertheless, it is apt to occasion unpleasant results, especially in strumous subjects. Soreness and excoriation of the edges of the lids, tinea, loss of the eyelashes, inversion of the edges of the lids, trichiasis, &c., are among the number. Variola itself is apt also to excite a strumous condition of constitution, leading to strumous ophthalmia, &c., and occasionally we witness disease of the lachrymal sac and apparatus as a sequela of small-pox.

Primary Variolous Corneitis.—In several variolous epidemics I have witnessed, not a single instance of primary corneitis has taken place, and some authorities, including Dr. Marson,* consider that the eye possesses a complete immunity from the primary eruption, the destructive form of inflammation being always a secondary affection analogous to the sloughing of the cellular membrane in other parts of the body, which occasionally follows small-pox.

Dr. Marson mentions that there is great redness in the inflammation which arises in the early stage, with chemosis, which continues for a few days, but subsides without mischief. The common abscess of small-pox, familiar to all practical men, forms on the eye between the conjunctival membrane and the sclerotic, and also between the layers of the cornea, of which Dr. M. has seen five or six cases in fifteen hundred. These abscesses are small, take place contemporaneously with abscesses in other parts of the body, and the eyes recover unimpaired. A *deep-seated* inflammation now and then occurs, which appears to destroy sight very speedily, without producing ulceration of the cornea, and is met with in persons who have small-pox in a very severe form, and die on the seventh or eighth day.

The particular local affection which destroys the eye, according to Dr. Marson, begins about the 11th or 12th day, or later, from the first appearance of the eruption. It comes on after the secondary fever has commenced, with redness and slight pain in the part, whilst the margin of the cornea speedily ulcerates. This continues to spread with more or less rapidity, according to the degree of secondary fever present, and in the worst forms an ulcer is formed on each side of the cornea at the same time, which extend together. In one example it

* Lancet, vol. ii. 1838-9, p. 235.

passed around the entire margin of the cornea, loosening three or four layers almost in as an entire a state as they may be separated from the dead eye. By the extension of ulceration, the anterior chamber is penetrated, and the iris escapes. In the worst cases there is usually hypopion, and when the matter is discharged, the crystalline lens and vitreous humour escape; or the humours may be discharged from sloughing of the cornea; this being succeeded by the total annihilation of the form of the eye, as well as the sight. A severe degree of secondary fever always attends bad cases, having been preceded by a very confluent state of the disease. The local mischief sometimes goes on without the least pain to the patient, or his being aware that anything is amiss with the eye.

Of *secondary variolous corneitis* I have seen several examples. It comes on usually about the fourteenth day from the first appearance of the eruption, sometimes as early as the eleventh or twelfth, or not till the patient has been convalescent for two or three weeks. In Dr. Marson's practice twenty-six cases occurred in a thousand of variola, of whom eleven lost an eye. It would appear that the nature of the disease varies in different cases; that in some, matter forms between the layers of the cornea, or the conjunctiva and sclerotica, contemporaneously with abscess in other parts of the body; in some the cornea ulcerates, in others sloughs.

Symptoms.—The disease commences with redness and pain in the affected part, soon followed by a circumscribed dull whitish opacity of the cornea, surrounded by slight haziness. When the cornea ulcerates a breach of surface is soon formed, having its seat almost invariably at the margin; and Dr. Marson has more than once seen the entire cornea swept away within forty-eight hours. In unfavourable cases the ulceration extends both in depth and breadth, until it perforates the membrane of the aqueous humour, often allowing the iris to protrude, or the globe itself suppurates, and almost all the contents of the eyeball escape. Occasionally the cornea sloughs, when the dead portions separate, allowing, as in the former instance, of the escape of the humours, the eyeball collapses, and vision is permanently destroyed.

Treatment.—When the eruption occurs on the palpebræ, the chief endeavour will be to stop the disease during the early stages of its progress. Numerous plans have been suggested to effect this desideratum,—among which exclusion from light seems to be the chief condition essential to success; thus, the emplastrum ammoniaci cum hydrargyro, solution of gum arabic, immediately followed by the application of gold leaf, &c., are said to be successful. Nothing, however, answers better than to touch the papulæ at an early stage with the stick of the nitrate of silver; or, if they have suppurated, to open the pustules by a small puncture, and touch the surrounding inflammation lightly with the solid nitrate. In both instances the peculiar influence of the

nitrate is induced, besides the blackening and consequent exclusion of light.*

Variolous conjunctivitis requires but little general treatment apart from the general management of the fever. The eyes should be frequently bathed with warm poppy decoction, and a little dissolved cerate smeared once or twice a-day along the ciliary margins. If the inflammation be more than usually severe, and the general condition allow, a few leeches may be applied near the eyes, selecting the situation according to the position and character of the eruption. But it is eminently true that we must not act on preconceived views, but treat each case according to the actual indications present, and thus leeches may be occasionally useful; still, as a general rule, tonics will be found more applicable than antiphlogistics.

In the treatment of secondary corneitis the patient rarely bears even local blood-letting without injury. The lids should be acted upon by the nitrate of silver, according to circumstances, and mild tonic aperients, with alteratives, be occasionally administered. The whole chance, however, of saving the organ in the worst cases consists in upholding the powers of the patient by tonics, nutritious diet, and mild stimulants, and by the local action of the nitrate of silver on the skin of the eyelids. In the more asthenic forms, mercury, except in small alterative doses, is injurious, but it may be used, in combination with tonics, in the milder and more chronic cases.

SECT. XIV.—ABSCESS, ULCERATION, AND FUNGUS OF THE CONJUNCTIVA.

A circumscribed inflammation of sub-conjunctival cellular tissue sometimes comes on, which may proceed to the formation of abscess. The affection is rare, and of very little importance; nevertheless it has received the title of "*sub-conjunctival phlegmon*," and has a separate section devoted to its consideration in some works on the eye. It may be recognised by its presenting the appearance of a small elevated, inflamed spot, without general conjunctivitis. A purge, and a warm solution of the acetate of lead occasionally used, is all that is necessary.

Ulceration.—The conjunctiva occasionally ulcerates from the bursting of an abscess, pustule, or phlyctenula, or from purulent and granular inflammation. In either case it is of little consequence in itself, and heals readily under the treatment necessary for the disease which it accompanies. In speaking of passive chronic conjunctivitis, I mentioned that ulceration of the lining of the upper lid had several times come under my observation, in connexion with that affection. In

* It is asserted that the following application is very successful in the prevention of small-pox pustules:—Ten grains of camphor, dissolved in two drachms of sulphuric ether. Dr. Allè has employed it with much advantage in the incipient stage of the eruption on the eyelids.—*Oester. Med. Wochensch.*, No. 50, Dec. 1842

these cases it proves more obstinate, but requires no distinct or peculiar treatment. A fungous excess of granulation sometimes accompanies the healing of these ulcerations, and may demand one or more applications of the sulphas cupri in order to repress their exuberance. The remedy should be lightly applied, and the lid kept apart from the globe a few minutes after its use.

In an hysterical female, a small fungous growth, which sprung from the conjunctiva lining the tarsus of the upper lid, apparently from a breach of surface, bled considerably. The blood flowed very slowly for some hours every morning, trickling over the cheek, and occasionally at other parts of the day. The menstrual function was healthy. The disease had lasted for some months, and no plan of treatment seemed to afford any permanent relief.

Fungus.—Fungoid growths from the conjunctiva are by no means frequently met with; but occasionally they are found springing by a more or less narrow pedicle from the sclerotic or palpebral portions of this membrane. The most common form is a red, fleshy, minutely lobulated, or granulated growth, which becomes adapted to the shape of the inner surface of the lid and the front of the eye, by the pressure to which it is subjected. They appear to be perfectly innocent in character, but apt to attain a large size if neglected; in which case it covers the front of the cornea (although it never springs from that tunic,) and, from exposure to the air between the lids, is apt to dry, and to become irritable, and inclined to bleed.

Dr. Mackenzie has described another variety of a gelatinous consistence, and of a light yellow or brownish colour, which is met with chiefly on the inside of the upper lid, and in the superior fold of the conjunctiva. Dr. M. states that it sometimes attains a very considerable size, and although soft, and destitute of red vessels, is apt to prove destructive by the pressure which it exercises on the eyeball.

These fungous growths are perfectly free from pain, increase slowly, and, when removed, do not return. Their nature can scarcely be misunderstood if a careful examination of the front of the eye be made with a probe, and their appearance and characters be taken into consideration. Dr. Mackenzie, however, speaks of their destroying the eyeball, if neglected, and requiring extirpation, and Mr. Watson has performed the operation in several similar cases. Such cases must be very rare, whilst it argues great neglect either on the part of the patient or the medical attendant, to allow them to attain so great a magnitude. May not some of these unfavourable cases be of the nature of fungus hæmatodes?

Treatment.—The growth should be firmly held with a pair of forceps, and drawn towards one side, so as to expose its attachment, which should then be entirely removed, together with the portion of conjunctiva from which it springs, either by a pair of curved scissors or the scalpel. An astringent collyrium should be employed for a short time subsequently.

SECT. XV.—DRY AND CUTICULAR CONJUNCTIVA.

Synonyms.—Xeroma, xerosis conjunctivæ, xerophthalmia.

Derivation.—Ξηρος, dry.

Definition.—Xeroma signifies a dry condition of conjunctiva, from a deficiency or entire absence of its proper mucous secretion.

A simply dry, shrivelled state of the conjunctiva is sometimes a congenital defect of the membrane, or arises from protracted inflammation, whilst the “cuticular conjunctiva” is invariably a result of constant exposure to the air, and want of protection from the influence of injurious agents. Some authors seem to think that this state of the membrane arises from a deficient supply of lachrymal fluid; but facts disprove this assumption, inasmuch as no inconvenience of the kind necessarily arises from removal of the gland itself, or from its implication in disease.

Mr. Wardrop, in the *Lancet* for Nov. 24, 1834, has narrated a well-marked case of congenital xeroma, and Professor Von Ammon (*Zeitschrift für die Ophthalmologie*, vol. i. and ii.), has published some examples of the complaint. In one patient, who had had xerosis for some years, there was partial symblepharon, especially at the internal canthus, where the lids adhered both to the caruncula and to one another. In one eye both puncta lachrymalia were closed. There was contraction of the tarsus, and partial trichiasis in both upper lids, and the lids could not be shut on account of the symblepharon, or drawn away from the globe. When an attempt was made to raise the upper, the conjunctiva was drawn into folds below the cornea. The conjunctiva oculi was quite dry, and of a dirty-white, dead appearance, which was particularly remarkable over the cornea. Moreover, the eyes were so insensible that they could be rubbed pretty strongly with the finger, without exciting pain.

A rough cuticular condition of the conjunctiva comes on whenever the eye is constantly exposed and subjected to much irritation; for instance, from lagophthalmos, symblepharon, trichiasis, entropium and ectropium.

Unless we can remedy the affection which occasions xeroma, little or nothing can be done for its cure. The organs may be bathed with tepid poppy-decoction frequently, and a little simple cerate should be introduced between the lids sufficiently often to relieve the unpleasant dryness and stiffness.

SECT. XVI.—PTERYGIUM.

Definition.—Pterygium is a triangular fibro-vascular thickening of the conjunctiva, extending in its growth from the circumference of the globe over the cornea, its base being usually situated at the circumference.

Derivation.—Πτερυξ, a wing.

The term pterygium is probably applied to this disease from its wing-like shape and appearance, stretching usually from one of the canthi towards the centre of the cornea. The inner canthus is most commonly the primary seat of the affection, and subsequently constitutes its base, although it may proceed from the outer canthus, or still more rarely from beneath the upper or lower eyelids, from above the insertion of the tendons of the superior or inferior recti muscles. Occasionally two growths of this kind are present at the same time, and a few instances have been known in which four pterygia have formed, and, advancing upon the cornea, have completely obscured the pupil. The shape of the growth is always more or less decidedly triangular, with its apex almost invariably directed towards the centre of the cornea—the latter not being very acute, but obtuse and rounded, whilst the lateral boundaries are concave from a slight inclination towards the centre. Mr. Tyrrell (*Treat.* vol. i. p. 187) says, however, that in a few cases he has seen the base of the pterygium opposed to the circumference of the cornea, whilst the apex was directed towards the orbit.

The disease is extremely rare before puberty; it mostly attacks middle-aged individuals, especially those who have resided for any length of time in a warm climate.

The affection commences with slight thickening of the conjunctiva, as I have remarked, most frequently at the inner canthus, with several enlarged and somewhat tortuous conjunctival vessels running towards the cornea, and converging slightly towards each other. It advances very slowly, gives no uneasiness, nor occasions any unpleasant symptoms, until it impedes vision by encroaching on the cornea, in front of the pupil, so that it may remain even for years without attracting much of the patient's attention. In proportion as it increases in size it becomes more raised, vascular, and fibrous, but still possessing the smooth conjunctival surface. It is connected to the subjacent parts by loose cellular tissue simply, so that it can be readily taken up with the forceps and moved about. Scarpa (*Trans.* by Biggs, p. 236) attributes the triangular shape of pterygium to the adhesion of the lamina of the conjunctiva becoming stronger in proportion as it advances from the circumference towards the centre of the cornea.*

After a time the diseased process extends on the cornea, and, from the same cause that occasions its triangular shape it becomes less thick

* Mr. Walker's theory of the triangular shape of pterygium seems more rational, viz. that the conjunctiva receives its supply of blood from four distinct points—the angles and the superior and inferior portions of the globe—and that each set of vessels is destined for the nutrition of one-fourth of the conjunctival membrane. As these vessels converge towards the cornea it is obvious they must assume a triangular shape, with the apex directed towards the centre of the cornea. In pterygium one or more of these sets of vessels are independently affected, and proceed from that portion of the periphery towards and upon the cornea to its centre, beyond which they never extend—thus occupying and being limited to one-fourth of the conjunctival surface, and therefore imparting to the diseased structure a triangular shape.

and vascular as it proceeds. Now it is that the patient becomes seriously alarmed and applies for relief—the number of patients who wait till the light is actually excluded by its advance in front of the pupil must be few indeed.

The *causes* of this disease are extremely obscure, nay, are unknown, although middle age and residence in a warm climate certainly predispose to the affection. It has been attributed to attacks of inflammation, and some authorities have considered it essentially of an inflammatory nature, although it presents nothing in common with this morbid process, either in duration or symptoms, nor does it come on in those who have suffered repeatedly from attacks of inflammation, as a mere effect or consequence of such disease. An invariable effect of pterygium is to loosen the natural connection which subsists between the conjunctiva and the subjacent parts, and this has led some observers to attribute it altogether to sub-conjunctival deposition.

Different forms of the affection are met with in practice, their difference depending on their thickness and vascularity. They may be described as belonging to two genera, the *pterygium tenue*, or membranous pterygium, and the *pterygium crassum vel carnosum*, or fleshy pterygium. The former includes all the delicate semi-transparent and slightly vascular specimens of the disease, whilst the latter embraces the thick, opaque, vascular, and fleshy kinds of this triangular growth.

There is a form of disease simulating pterygium, but of an essentially different nature, which it is necessary I should describe. It is seen on the upper surface of the globe, where it forms a preternatural connection between the upper lid and the cornea. The broader portion occupies the upper edge of the tarsal cartilage in its entire breadth, whilst the narrower (which is not pointed) adheres to the lower portion of the cornea. It is not attached to the globe except by its lower portion, so that a probe can be passed between the eyeball and the lid underneath this band of conjunctiva. It depends on a peculiar form of adhesion or symblepharon between the lining membrane of the upper lid and the cornea, produced when the upper lid is greatly swollen, and when both it and the cornea are ulcerated, as in purulent ophthalmia. When the swelling subsides the return of the tarsal cartilage to its place draws the conjunctiva into the fold observed in these cases. Mr. Travers has given two drawings at the end of his Synopsis, the one of a fleshy the other of a membranous pterygium, appearances which came on after repeated inflammations, and which were, doubtless, of this nature.

Treatment.—The surgeon is unable to retard the growth of pterygia by general or local treatment, although injudicious interference may greatly increase their rapidity of growth and alter their character. The rule of treatment should, therefore, be either to remove them altogether by operation, or religiously abstain from doing anything. In many cases such growths do not require removal for years, and certainly do not call for operative measures, unless the patient should

strongly urge it, till they have advanced so far on the cornea as to threaten obstruction to vision if neglected much longer.

The removal by operation is exceedingly simple. When the pterygium occupies but a small part of the circumference of the cornea, it is the best plan to commence by dissecting it off that structure, and carrying the dissection near the base of the growth, where it should be snipped off with scissors.

When the pterygium is thick and fleshy, occupying much of the cornea, it is not expedient to dissect it from that part. Under these circumstances, the eye being directed inwards, so as to relax the pterygium, it should be raised from the sclerotic by the forceps, and a small sharp knife, or one blade of a pair of scissors passed underneath it, with the flat part directed towards the sclerotica. The growth should now be cut or shaved off close to the junction of the cornea and sclerotica, leaving the portion on the cornea, and dissected off the sclerotic, as in the former operation, but taking care not to encroach too near the caruncle. Subsequently nothing more is necessary than to lay a damped piece of linen or lint over the eye, to keep the patient quiet in a moderately darkened apartment, and to administer a gentle aperient. The surface heals readily, but should the granulations be profuse they may be repressed by a sulphate of zinc lotion, or if necessary be removed by the convex scissors, or touched with sulphate of copper. Such portions of the pterygium as are not removed by the knife rapidly shrink and disappear, and its reproduction is an extremely rare occurrence.

SECT. XVII.—PINGUECULA.

Syn.—Pterygium pingue.

Pinguecula, so called from its presumed fatty nature, consists of a small yellowish-white rounded tumour, which elevates the conjunctiva close to the cornea, opposite the angles of the lids. It more commonly affects the inner or temporal side of one or both eyes, but may also attack the outer. Pinguecula rarely occurs before middle age, occasions neither trouble nor inconvenience, and does not require to be interfered with in any way.

SECT. XVIII.—POLYPOID, WARTY, AND OTHER TUMOURS OF THE CONJUNCTIVA.

Small Polypi are occasionally met with, analogous to the innocent or mucous polypus of the nose, growing from the palpebral conjunctiva and the fold between the lid and globe. In snipping off a small tumour from the tarsal surface of the upper eye-lid, Mr. Lawrence found its peduncle hard, so as to require some force in dividing it. It was found to be fibro-cartilaginous, and thoroughly hard internally, conjunctival externally; it had probably grown from the cartilage of the lid. The complaint had existed fifteen years, and had caused

trichiasis of one quarter of the upper eye-lid. Dr. Mackenzie saw a soft red tumour growing by a pedicle from the caruncula, which bled on being touched. The greater part came away in the grasp of the forceps, and looked exactly like the soft polypus of the Schneiderian membrane. Polypi should be snipped off with a convex pair of scissors.

Warty Growths may form on any part of the conjunctiva, including the front of the cornea. They occur either singly or in clusters, and are red, fleshy, fissured, or granulated on the surface, sometimes attaining a considerable size, and setting up much irritation.

In plate iv. fig. 1 (vol. i.), Mr. Wardrop has represented a tumour which had an unequal surface, was of a peculiar dark brown colour, and of a soft texture. Tumours of various kinds occasionally grow from the conjunctival surface, or are formed in the sub-conjunctival cellular tissue. Mr. Lawrence snipped away several cartilaginous bodies, from the sclerotic conjunctiva, about the size of pins' heads; and Voigtel (*Handbuch der Pathologischen Anatomie*) quotes a case where, after a violent inflammation of the eye, a small white point appeared on the inferior part of the cornea, which gradually grew into a hard cartilaginous tumour of the bulk of a pea. Its base covered one-half of the cornea, and its surface was interwoven with large blood-vessels.*

Mr. Travers (*Synopsis*, edit. 2nd, p. 102) excised the anterior hemisphere of the eye-ball in an elderly lady, where the cornea was concealed by a tumour of a dark purple colour, which occasioned great inconvenience and deformity by its protrusion between the eye-lids. It was disposed in lobes, resembling a bunch of currants of unequal size. On dissection, the cornea and sclerotic proved to be entire; the surface of the cornea being rough, and of a brownish tint, as if beginning to degenerate into the morbid mass which lay above it. The substance of the tumour was firm, of a dark colour, here and there mottled with white, and intersected by whitish lines placed perpendicularly. It is represented in plate 2 of that gentleman's work. There can be little doubt of its being a melanotic tumour. Vide next section. The patient recovered quickly from the operation, and the eye shrunk in the orbit.

Congenital Tumours are of various kinds,—fibrous, warty, or having hairs growing from them. Mr. Wardrop considers that they resemble in character *nævi materni*. Small *fibrous tumours* are sometimes met with of a globular shape, and the size of a split pea, intimately attached to the corneo-sclerotic junction, opposite one or both of the angles of the lids. Mr. Tyrrell represents them in his 1st vol. plate viii. fig. 4.

Tumours, having hairs growing from them, have been met with and described by several persons. They are of a whitish colour, smooth

* In elephantiasis tubercular deposits occur in the eyelids and beneath the conjunctiva around the cornea.

surface, and covered by the healthy conjunctiva, from which the hairs grow.

Mr. Wardrop (vol. i. p. 32, and plate 4) has described and figured a growth of this kind. The patient was about fifty, and the tumour was congenital. It was about the bulk of a horse-bean, and was situated chiefly on the white of the eye, near the temporal angle of the orbit, whilst a small portion grew from the cornea. Its surface was smooth, and seemed to be covered by the conjunctiva, having the natural colour of that membrane. A considerable number of very long and strong hairs, upwards of twelve in number, grew from its middle, passed through between the eyelids, and hung over the cheek. These hairs did not appear until he had advanced to his sixteenth year, at which time also his beard grew.

Any of these growths may be removed if they occasion annoyance either from their appearance, increase, or the irritation they excite. According to their size, situation, or shape, they are to be seized with the spring forceps or hook, and cut off either with scissors or the scalpel.

Encysted Tumours sometimes form in the sub-conjunctival cellular tissue; they may consist of mere cysts containing a watery fluid, hydatids, or fatty and other matters, such as hairs, &c. Two instances occurred in Mr. Middlemore's practice (vol. i. p. 397), where, on dividing the conjunctiva, with a view of removing the cyst entire, an hydatid escaped, and rendered any further measures unnecessary. These tumours, being loosely attached, are readily removed. Mr. Abernethy (*Surgical Obs. on Tumours*, p. 54) refers to a case, published by a Moscow physician, of a tumour—which he denominates pancreatic sarcoma—which grew beneath the conjunctiva, and pushed it out from between the eyelids. It was 7 inches long, and 3 inches and $\frac{1}{2}$ in circumference, and weighed two pounds and a half. The tumour was closely connected with the conjunctiva, but did not involve the cornea, which retained its natural transparency.

Mr. Walker (*Oculist's Vade Mecum*, p. 95) mentions two cases of an affection which he thinks has not been elsewhere described. They occurred in infants, and consisted of a considerable tumefaction and bulging of the conjunctiva of the outer canthus. It was produced evidently by a sub-conjunctival growth, which was quite smooth, and of a cartilaginous appearance, terminating in a well-defined semi-circular ridge at a short distance from the cornea. In the first it disappeared from a few applications of the nitrate of silver, but in the second the friends ceased to attend before any alteration was perceptible.

SECT. XIX.—MALIGNANT DISEASE OF THE CONJUNCTIVA.

Genuine carcinomatous disease of the eye affects only the lids, conjunctiva, and lachrymal gland, as its primary seats. On the conjunc-

tiva it appears as tuberculous enlargements, attended by lancinating pains and the other indications of scirrhus tubercle, which, after a longer or shorter period, go on to ulceration and the production of fungus, with much derangement of the health and cachexia.

Mr. Travers remarks, that there is a malignant fungus of the conjunctiva, for, like the mucous membrane of other parts, this is sometimes the seat of carcinoma; and, excepting the lachrymal gland, he believes that no other texture related to the organ of vision is ever primarily so affected. He has removed the contents of the orbit for a painful tuberculous fungus, with ulcerated depressions, containing an ichorous discharge. The coats and humours of the eye were for the most part absorbed, the lachrymal gland scirrhus. The disease afterwards returned upon the palpebræ and destroyed the patient. In 1821, Mr. Travers had a similar case under his observation. The fleshy tubercles grew from the conjunctiva, both on the cornea and sclerotic, and the inferior palpebra was extensively ulcerated. This was accompanied by lancinating pains in the supra-orbital region, and an unhealthy discharge. (Plate 2, fig. 1.)

Mr. Morgan also, in his lectures on the diseases of the eye, mentions a case of carcinoma of the conjunctiva, which was also combined with a similar disease of the lachrymal gland. The carcinomatous ulceration extended to the palpebræ, and proved fatal.

Melanosis, or a black fungous mass, possessing all the ordinary external and intimate appearance and structure of melanotic growths, occasionally, but very rarely, originates in the conjunctiva; by its increase it covers the front of the eye, and (for a time at least) simply covers without involving the component textures of the globe. Such disease closely simulates the more deeply seated affection in appearance when it has protruded through the ulcerated cornea, and might lead the unwary to propose and perform extirpation of the eye-ball, when the disease is simply superficial, and might be removed with little or no injury to the globe or to the function of vision. In all such cases, therefore, we should carefully weigh the history of the disease, and examine minutely the condition of the organ, ascertaining whether the growth can or cannot be lifted up from the front of the eye. The case narrated by Mr. Travers, of a "dark purple tumour," resembling a "bunch of currants," which grew from the conjunctiva, appears to me to be of this nature.*

Treatment.—The proper treatment for scirrhus tubercles and external melanosis would undoubtedly be, to remove them *entirely* at the earliest possible period, without unnecessarily injuring the eyeball, and most decidedly without removing the globe. If seen sufficiently early, the dissection recommended in pterygium is equally applicable here; but, should the diseased portions have become so adherent to the adjoining tissues as to prevent their removal in this manner, the

* Vide also a case of melanosis of conjunctiva by Mr. W. W. Cooper, Lond. Med. Gaz. vol. i. p. 324, &c., 1842-3.

front of the organ must be sacrificed by a similar operation as is practised for the cure of staphyloma.

SECT. XX.—MORBID ADHESIONS OF THE CONJUNCTIVA.

Synonym.—Symblepharon, fræna.

When the opposed surfaces of the conjunctiva of the lids and eye are rendered raw by any cause, it is difficult, if not impossible, to prevent their union in the subsequent healing process. The most common causes of this result are wounds, the introduction of powerful caustic matters, as lime, between the eyelids, and ulceration following inflammation. The symblepharon which thus results from the inosculation and junction of the opposed granulations presents different appearances in different cases; occasionally the junction between the lids and globe may be complete, or nearly so; more commonly it exists in a limited portion only; and in this case the conjunctiva is drawn out by the motions of the organ into a band or fold, constituting a frænum. Such bands are sometimes thick and fleshy, at other times thin and membranous, with apparent vascular ramifications.

When once formed, adhesions of the conjunctiva do not admit, as a general rule, of cure by any *treatment*; nor can we often prevent their formation after the introduction of lime, &c. under the lids, if it occasions sloughing and ulceration of the tunic. It is true, however, that limited adhesions are rarely of serious consequence, and hence need not occasion the patient any anxiety. Mr. Tyrrell (*Treat.*, vol. i. p. 192) has repeatedly tried by the greatest care and attention to prevent the formation of fræna; but, though he succeeded in preventing the immediate inosculation of the granulations, he was never finally able to obviate the formation of a frænum. It appeared to that gentleman that a contraction of the cicatrix takes place after the healing process is completed, similar to that we so frequently see in the extensive cicatrices formed after burns in the integuments. In two cases, after excising the band or frænum, he kept a very thin and smooth piece of silver constantly between the eyelid and globe, so as effectually to prevent inosculation of granulations as the surfaces healed. When perfectly healed, much good appeared to have been effected; but in less than six months contraction of the new formed matter had taken place, and fræna were developed as bad, or worse, than those which he had removed.

SECT. XXI.—STAINING OF THE CONJUNCTIVA FROM NITRATE OF SILVER.

The conjunctiva is apt to be stained of an indelible olive colour by the prolonged use of solutions of nitrate of silver. Only one case has come under my own observation, in which a gentleman had continued to employ a solution of this salt, one grain to the ounce of water, for

the space of two years. He had been ordered the "drops" for an opacity of the cornea, and had continued to use them without further advice. The circumstances essential to the production of stain seem to be a continued use for several months, or even years, of a comparatively weak solution of the remedy; hence nitrate of silver should never be employed in solution, as an application to the conjunctiva, for too long a period.

Dr. Patterson states, in the *Dub. Med. Press*, that he has found a solution of the iodide of potassium remove stains on the skin produced by the local application of the nitrate of silver. A solution of this remedy is therefore worthy of trial in stained conjunctiva, as it could do no harm, and might be of much use.

SECT. XXII.—INJURIES OF THE CONJUNCTIVA, AND IMPACTION OF FOREIGN BODIES.

The conjunctiva is exposed to injury from the intrusion of foreign substances between the lids, whether acting mechanically or chemically. By some of these, blood is effused beneath its structure, or it is contused, lacerated, or incised; by others it is violently irritated, chemically changed, or its vitality destroyed.

Mechanical Injury.—One of the most common effects of slight injury is subconjunctival effusion of blood, or *ecchymosis*, which sometimes even occurs spontaneously, or from straining, coughing, and the like, and often when the blow affects the head or face, without touching the eye at all. It may complicate severe and dangerous injuries of the eye and other parts; but, when it forms the only symptom, it is an accident more formidable in appearance than in reality.

At first the effusion is of a bright red colour and uniform appearance, terminating abruptly at the edge of the cornea, and, when in small quantity, occurring in patches with abrupt defined edges; but it becomes of a dusky red colour as it disappears by absorption.

The *diagnosis* of ecchymosis is a matter of no difficulty, especially when it has been once seen, and its peculiarities have been carefully examined. It is known from conjunctivitis by the uniformity of its tint, the complete absence of distended vascular ramifications, its abrupt outline, and its usual occurrence in patches. Its appearance and sudden accession, with the history of its cause, would be quite sufficient to diagnose the affection under any circumstances, even where the effusion is much more considerable, and where the whole sclerotic is hid, from the cellular tissue between it and the conjunctiva being filled with red blood. Besides, all the other indications of inflammation are absent except mere redness; there is no scarlet vascular reticulation, no pain, lachrymation, or sensation of sand between the globe and lids, &c.

Mere ecchymosis, as far as I have seen, is never of the least consequence *per se*, and, in whatever quantity, is always removed without

difficulty by the natural powers of absorption. A weak solution of the acetate of lead, used cold, may be dropped between the lids frequently in the first instance, to be replaced subsequently by a solution of sulphate of zinc. If the eye has been at the same time contused, the patient should be kept quiet, and have his alimentary canal thoroughly cleared out by an active purge or two, using leeches, &c., if any threatening symptoms of inflammation arise. If the eyelids be at the same time much loaded with effused blood, they may be covered for some hours with a poultice, composed of black bryony-root scraped finely, with soaked bread, and placed in a muslin bag.

Slight *incisions* or *contusions* of the conjunctiva, such as result from accidentally forcing the finger-nail, or rubbing the brim of a hat against that membrane, rarely give rise to any serious consequences. More extensive injuries call for active treatment according to their gravity.

Scalds and Burns.—The passage of hot substances between the lids occasion more or less severe effects, according to the circumstances, such as violent irritation, vesication, superficial or deep destruction of the tissue. In the first place (foreign matters being removed), we should endeavour to allay the violent irritation of the parts by warm and sedative fomentations, &c., and subsequently prevent or remove the inflammation which succeeds.

When the eye is burnt from the explosion of gunpowder, grains of that substance are apt to be imbedded in the conjunctiva, or forced beneath it. These should be carefully removed as soon as the intense primary irritation is subdued, when this can be done without much pain to the patient, or injury to the organ. In general, we cannot remove the grains forced beneath the membrane without inflicting more injury than is desirable or necessary in the circumstances of the case, though these grains greatly disfigure the organ if they are not removed.

It is remarkable that molten lead rarely occasions very serious consequences. Mr Tyrrell (Treat., vol. i. p. 204) has several times taken out from beneath the palpebræ portions of lead, weighing many grains, which had evidently entered the eye in a fluid state, being perfectly moulded to the surfaces of the globe and palpebræ, yet the conjunctiva remained free from all injury except slight inflammatory action. The same facts applied also to a case treated by Mr. Lawrence at St. Bartholomew's Hospital.

Chemical Injuries.—Caustic alkalies destroy the vitality of the conjunctiva either deeply or superficially, and render the cornea white. When pure lime gets between the lids, it not only renders the cornea of a milk-white colour, but makes it so perfectly dry and friable, that it can be brushed off with a hair-pencil. The action of mortar is not so powerful; it renders the cornea white, but does not decompose it. These substances occasion the patient the most violent suffering, and phenomena of the most intense irritation are set up, which do not speedily subside. Usually portions of the offending substance are

found adhering to the eyelashes, and some small pieces on the conjunctiva, notwithstanding that the patient most commonly resorts at once to the diligent application of warm water to relieve the severity of his sufferings, and the abundant lachrymal and conjunctival secretions wash away the bulk of the extraneous substance. Violent inflammation of the whole conjunctiva succeeds the early impression; but the severity of these symptoms, and the degree of thickness in the sloughs, depends much on the quantity of lime introduced, and the length of time it has been applied.

Treatment.—When it falls to our lot to see such a case, the first necessary step is to remove, with the end of a feather or a curved cataract-needle (Scarpa's needle), every portion of foreign matter which can be taken away in this manner, and to wash the conjunctiva thoroughly with some very dilute vinegar and water, if any undecomposed lime, or other portion of alkaline matter, remain between the lids. Mr. Tyrrell recommends (*Treat.*, vol. i. p. 205) the proportion of a teaspoonful of vinegar to a pint of water. It should be used warm, and thrown, by means of a syringe, with care over the surface of the conjunctiva, and beneath the lids, whilst the organ may be also freely bathed with the same mixture externally. Having thoroughly cleansed the eye from foreign matters, the organ should be covered with a damp rag; venesection, leeching, &c., according to the patient's condition, should be resorted to, and abstinence, rest, and exclusion from bright light enforced, to lessen the violence of the succeeding inflammation. If the separation of sloughs be tedious, tonics may be required, with good diet, and a local, soothing, or mildly stimulating plan of treatment, according to circumstances.

The local effects of *acids* are nearly similar to those produced by lime and alkalis, acting both chemically on the parts touched, and destroying their vitality. When called on to treat such an accident, and we suspect that any unneutralised acid is still present between the lids, a little very dilute alkaline solution should be thrown between them: in case such is not to be readily got at, common soap and water will prove a good substitute. The subsequent treatment will vary little in its general principles from that before laid down for subduing other forms of conjunctivitis.

Irritating powders also sometimes get between the lids, either from reducing pharmaceutical substances to powder, or in some other accidental manner; whilst in some few cases they have been known to have been intentionally used, in order to excite inflammation. They may often be detected on the conjunctival folds, or the roots of the eyelashes, &c. Fluids of an irritating character sometimes trickle down into the eye, when incautiously sprinkled on the forehead and face during faintness, &c.: thus sal volatile, lavender-water, &c. have been known to produce a smart attack of inflammation, subsequent to their use in this manner.

Foreign Bodies on or beneath the Conjunctiva.—The introduction of

a small, firm foreign body between the globe and lids give rise to very unpleasant symptoms, as I have remarked, somewhat similar to those of strumous conjunctivitis, and, if retained, it often leads to severe and protracted inflammation. In all cases of obstinate chronic inflammation, or where the patient thinks something has got into the eye, and refers to some particular spot as the main seat of his uneasiness, the organ should be carefully examined. In the first place, without touching the lids, the eye should be carefully examined in an oblique direction, in order to detect anything impacted in the cornea; the lower lid should then be depressed by the common integument, in the manner already explained, and the conjunctiva lining it, and that covering the globe should be viewed in a good light, and with much care, both directly and obliquely. Finally, the upper eyelid should be inverted, by placing a probe horizontally above the tarsal cartilage, seizing the lid by the eyelashes, with care, and then raising it by these, whilst we press downwards and backwards towards the eye gently with the probe. In this way we expose the lining of the upper lid, the conjunctiva of the upper part of the globe, and the fold passing between the eye and lid. It is not only necessary to inspect these parts carefully, but we should also, by the probe, open the fold, which is large and loose, as foreign bodies are often secreted between it, especially if much swollen from inflammation.

The intrusion of foreign matters may excite other effects than those of mere inflammation. The Duke of B. while walking was struck by a butterfly on the right eye. Smart inflammation followed, but subsided on the removal of one of the feet of the insect which had remained in the conjunctiva, leaving, however, a small eminence similar to a pustule. This still continued in the following year without uneasiness; but at this time he had an attack of catarrhal conjunctivitis, which yielded after eight days. The little tumour increased in size, and, appearing as a vesicle, it was punctured and cauterized. In March it was as large as a pea, and vision impaired from its encroaching on the cornea, whilst it was fed by several varicose vessels. M. Cunier made a puncture, and then excised it by scissors. The wound cicatrized in ten days. On placing the tumour in water, and examining it by a glass, it was found to be a *cysticercus cellulosæ*, with its four suckers and double circle of hooks quite distinct. (*Annal d'Oculist*, *abd.* from *Gaz. Med. Paris*, 3rd Dec. 1842.)

A detached eyelash between the lids gives rise to much irritation, and sometimes a most obstinate chronic ophthalmia is found to depend entirely on a minute, light-coloured one becoming inverted. A case is related in the "Netherlands Lancet" of a man who had suffered for many months from a most painful form of conjunctivitis, attended with great photophobia and an excessive flow of tears, when he applied for relief to Dr. Snablie, the surgeon-major of Breda. This gentleman discovered that a minute lash had become inverted, and was keeping up a constant irritation in the eye; and, it is added,

that no sooner was this extracted than all the previous symptoms vanished.

Cases are on record of foreign bodies being under the lids of very different characters. Even so large a foreign body as the common fly may get between the lids. Dr. Mackenzie states (*Pract. Treat.* p. 220) that a child was brought to him with puriform inflammation of the conjunctiva. On raising the upper lid, he found a common house-fly fairly lodged beneath it, having been so for eight days. The head of the fly projected from beneath the edge of the eyelid, and produced an appearance as if the eye were disorganized.*

A boy, *ætat.* 3, was brought to Dr. Eitner (*Medicinische Zeitung Von Preussischen Verein*, No. 49, 1842) with violent inflammation of the left eye in particular—the child declaring that he felt something “creeping in the eye.” The left upper lid was enormously swollen, and nearly covered the lower completely. On raising the upper lid, the posterior extremities of a mass of maggots were immediately brought into view. Twenty larvæ of the common bluebottle were extracted, each half an inch in length, and requiring a tug to loosen them from their position. A single larva was perceived and extracted from the inner canthus of the right eye. The child recovered under ordinary treatment. The cornea of the left eye recovered its transparency gradually. M. Cloquet relates the case of a man, *ætat.* 50 (*Pathol. Chir.* p. 60), following the double business of singer and rag-gatherer, who fell asleep in the fields when much intoxicated. Flies deposited their eggs in the eyes, ears, &c., and the larvæ passed into the nose, ears, and orbits, &c. Under the integuments of the cranium they formed large cavities, pierced with ulcerated openings, by which they escaped by thousands on pressure. The eyes were totally destroyed, and when the larvæ were removed through the perforations of the cornea, the crystalline lenses escaped. The integuments of the cranium became gangrenous, and the patient died a month after his admission into the Hosp. St. Louis. The bones of the vault of the cranium were in part necrosed, and the dura mater and arachnoid inflamed.

A priest, says Manniske, of Frankenhäusen (*Journal für die Chir. &c.*, Von Just C. Loder, 2nd Band. 1st Stuck.), requested my assistance concerning a speck on the eye. He had on the cornea of the right eye a dark speck which greatly impaired his vision. Two years before he found suddenly a little pain in the eye. By examination he remarked a black spot on the white of the eye below the upper lid; it did not hurt his sight, and the pain soon went away, so he took no further notice of the accident. Some time afterwards, he was aware that this spot had changed its situation, and appeared at the union of

* A curious case of hysteric monomania, where spiders, portions of web, and ova were discharged from the eye, will be found in the *Amer. Journal of Med. Science*, July, 1843, narrated by Dr. Lopez. There can be no doubt that they were placed there by the patient.

the cornea and sclerotica. The speck continued its progress very slowly but uninterruptedly, at length advancing on the cornea, so as to cover a portion of the pupil. At this stage, there was a prominent spot above the cornea, which felt hard, equalled the size of a small lens, but was longer than it was broad. Many small red vessels appeared like streaks around it. The patient had no pain. The indescribable hardness of the spot, with its situation, led to the supposition of its being a foreign body. An incision was made on the spot from without inwards, and with the assistance of a microscope a black body was seen lying in the incision. It was removed by the point of a knife from the small hole it had formed for itself in the cornea, and was found to be the hard wing-case of a beetle.

Foreign bodies, such as the husks of seeds, &c., adhering to the eye sometimes simulate pustules or opacities. They are to be diagnosed by a careful examination of the eye, the history of the case, and the shape and situation of the substance not strictly corresponding with the disease simulated.

If the conjunctiva be wounded, and the foreign body be of large size, it is apt to induce a fungous growth. In Weller's "Manual" (Monteath's translation, vol. i. p. 9) we find the case of a young girl who had a soft red fungus growing out of the eye, as large as a filbert. It was cut away, but in three weeks was as large as ever. It was again removed, and at the angle of reflection of the conjunctiva a piece of straw, half an inch in length, was observed and extracted. The cure was complete in a few days.

In smiths and other workers in iron or steel, minute metallic particles are frequently thrown in an ignited state against the cornea, and become buried in or beneath its conjunctival covering. These bodies are sometimes so small as to lie overlooked by any but an experienced eye; at other times they are larger, more angular, and buried to a greater depth in the cornea. I omit at present the consideration of perforating wounds in the cornea, where the foreign body lodges in the anterior chamber, wounds the iris, or even penetrates to the fundus of the globe.

The removal of foreign bodies which are firmly imbedded in the conjunctiva, or even forced beneath it, requires a little patience and dexterity. Where they are of some size, and situated in the fold between the upper lid and eyeball, the lid should be inverted, and the fold separated and exposed by means of a probe, by which we can force the foreign body into view, and bring it away with a pair of forceps. When in view, and simply adherent to the conjunctiva, a curved cataract-needle is the best implement to remove them with; in general, nothing more is necessary than to bring the point and side of the needle in contact with the body where it is adherent to the conjunctiva, and it comes away on the instrument without difficulty. Should it, however, have been forced beneath the conjunctiva, and it cannot readily be seen and removed by the wound already occasioned,

a question arises whether we should or should not attempt its removal at the time. Where it can be removed without enlarging the conjunctival wound, in a comparatively short time, and without much trouble or violence, it should be done at the time of the accident, and vice versâ. Also, should the foreign substance prove a source of irritation, after the more immediate effects have subsided, or, from its size or nature, occasion deformity, it should be removed subsequently. Instead of dividing the conjunctiva over it, and endeavouring to turn the body out in a methodical manner, it is best to follow the plan recommended by Mr. Middlemore,—that, namely, of raising the fold of conjunctiva which includes the foreign substance, and cutting it away with a convex pair of scissors. Supposing such substances to remain in the subconjunctival cellular tissue, without inducing much inflammation at first, they often continue for years in a perfectly passive condition, and are found to be cut off or isolated by the formation of a capsule around them. In one case, Mr. Wardrop (vol. i. p. 70) found a piece of whinstone lying close to the sclerotic coat, inclosed in a sac of cellular membrane, and which had remained for ten years prior to the person's death without his experiencing the least uneasiness, or even suspecting its presence. In such a case our interference would be obviously unnecessary.

When minute foreign bodies in the cornea can be left to nature, they generally become loose, and drop out by slight ulceration, which is set up around them, and unattended by any injurious consequence or serious symptom. It is stated, that occasionally, though I have never seen such an occurrence,* acute corneitis is set up, the cornea becomes opaque, or, after inflammation has been kept up for a long time, suppuration takes place around the body, and it is thus discharged. After the removal of the offending cause, the same means are necessary which I have already indicated.

Wounds of the conjunctiva are occasionally *poisoned*, as when made by the stings of bees or wasps. Such accidents give rise to intense suffering, followed by considerable inflammation and swelling. In some of these cases the sting is left as a foreign body in the wound which it has occasioned, and keeps up all the unfavourable symptoms.

A man, ætat. 60, had been stung about five weeks previously by a bee in the left eye. The sting was believed to have been taken out by the patient's ordinary attendant, but matters went on from bad to worse, and it seemed as if the eye must be lost. On examining the eye very attentively, an elevation the size of a millet-seed was perceived nearly in the centre of the cornea, and this, upon being touched laterally, was found to contain something hard, which proved to be the entire sting of the bee. In a month the cornea had so far recovered its transparency that the iris could be seen through it, and by

* Acute corneitis often results from slight wounds or scratches of the cornea, but not from the intrusion of those minute foreign bodies termed "blacks," or "fires."

degrees the eye was completely restored. (Casper's *Wochenschrift*, No. 48, 1842.)

SECT. XXIII.—IMPACTION OF LACHRYMAL CALCULI IN THE CONJUNCTIVAL FOLDS.

Calcareous concretions are occasionally, although rarely, deposited from the lachrymal secretion. Several cases are on record of such depositions being impacted in the folds of the conjunctiva, and which have proved sources of mechanical irritation. Professor Walther (Gräfe and Walther's *Journal*, vol. i. p. 163) has narrated a curious case of this disease, where the calculi were reproduced with great rapidity.

In 1811 a piece of lime fell into the eye of a healthy young woman; it was removed by Professor Walther, whilst the eye appeared to have sustained no injury. Some time after this, she began to complain of a burning stinging sensation in the eye, most severe on motion of the lids or globe, or in bright sunshine. On examination, a white angular concretion was discovered between the eyeball and the lower eyelid, towards the external angle of the eye. It was about the size of a pea, and was readily rubbed between the fingers into a greasy sandy powder. Professor Walther at first supposed it to be a portion of the lime which had fallen into the eye; three days afterwards, however, the patient returned with a similar calculus in the same situation, the eye being considerably inflamed, with pain in the eye itself, and in the course of the supra-orbitary nerve, &c. On the following morning the inflammation was much increased, and another concretion lay in the lower fold of the conjunctiva, which by the succeeding day had attained as large a size as the former. Antiphlogistic measures reduced the inflammatory symptoms, but the calculi continued to form with increased rapidity, and were removed twice a-day, and at length three times a-day, from the eye. After using a solution of carbonate of potash for six days, the activity of the disposition to form calculi greatly diminished. But one small concretion formed in twenty-four hours, and at length only a white crumbling powder, which required removal every second day. As, however, the disease decreased in the left, it attacked the same situation in the right eye, its course being exactly the same as in the first instance, although not so severe nor lasting as in the left eye. The whole course of the disease occupied nearly ten weeks. Some years after this, she was again attacked with the same disease, concretions forming first in the left eye, between the eyeball and under eyelid, and afterwards between the eyeball and upper lid. In a few days calculi began to form in the right eye. Walther ordered the solution of potash, which immediately checked their formation, and the whole process ceased in a short time. On analysis, the concretions were found to be composed of carbonate of lime, with traces of phosphate of lime, and coagulable lymph, or albumen; thus resembling salivary calculi, and the tartar deposited on the teeth.

SECT. XXIV.—SUBCONJUNCTIVAL ŒDEMA AND EMPHYSEMA.

The effusion of a serous fluid into the subconjunctival cellular tissue elevates the conjunctiva around the cornea, as in chemosis; but in simple œdema this elevation is transparent and nearly colourless, imparting a peculiar watery appearance to the eye instead of the bright scarlet protrusion of inflammatory chemosis. The fluid, being unconfined in the communicating cells of the tissue, gravitates towards the most depending situation, but does not disappear or lessen from the patient's assuming another posture, the subconjunctival tissue being cut off from the subcutaneous cellular system. Such a condition of parts is occasionally seen in old and infirm individuals, of cachectic systems, connected with chronic inflammation of some of the tissues of the eye, or it may remain in connection with a relaxed state of the conjunctiva after severe conjunctivitis.

Small vesicles, or circumscribed collections of fluid, may take place under the conjunctiva, especially towards the temporal angle of the eye, and Dr. Mackenzie states (*loc. cit.* p. 229), that the œdematous little fold sometimes degenerates into a cartilaginous state, and requires to be snipped away. But œdema *per se* scarcely requires any surgical treatment except mild astringents to the membrane, combined with general tonics. If limited collections of fluid do not spontaneously disappear, they may be touched with the nitrate of silver, or snipped off with scissors.

Emphysema.—A collection of air in the subconjunctival cellular tissue is a rare phenomenon, and one of little consequence in itself, except as indicating the nature of an accident. When the bridge of the nose is fractured a communication is opened between the air passing through the nostrils and the cellular tissue of the eyelids, &c. which, under these circumstances, frequently become emphysematous, but the subconjunctival cellular tissue escapes. If, however, the fracture extend into the orbit and lay open some of its cells, any powerful expulsive effort of the patient's is apt to force air into the subconjunctival cells, which may occasionally be let out by a lancet if unpleasant to the patient.

In practice we meet with a few other conditions, as the consequences of conjunctival inflammation, not worthy, however, of a separate and distinct description. Of these relaxation of the conjunctiva and subconjunctival cellular tissue may demand a gentle astringent collyrium, especially when in connection with atonic hyperæmia. The cellular tissue, also, may be consolidated, and bind the conjunctiva and sclerotica more firmly together than natural, &c. but these changes are of little consequence.